aero-naut

Bella

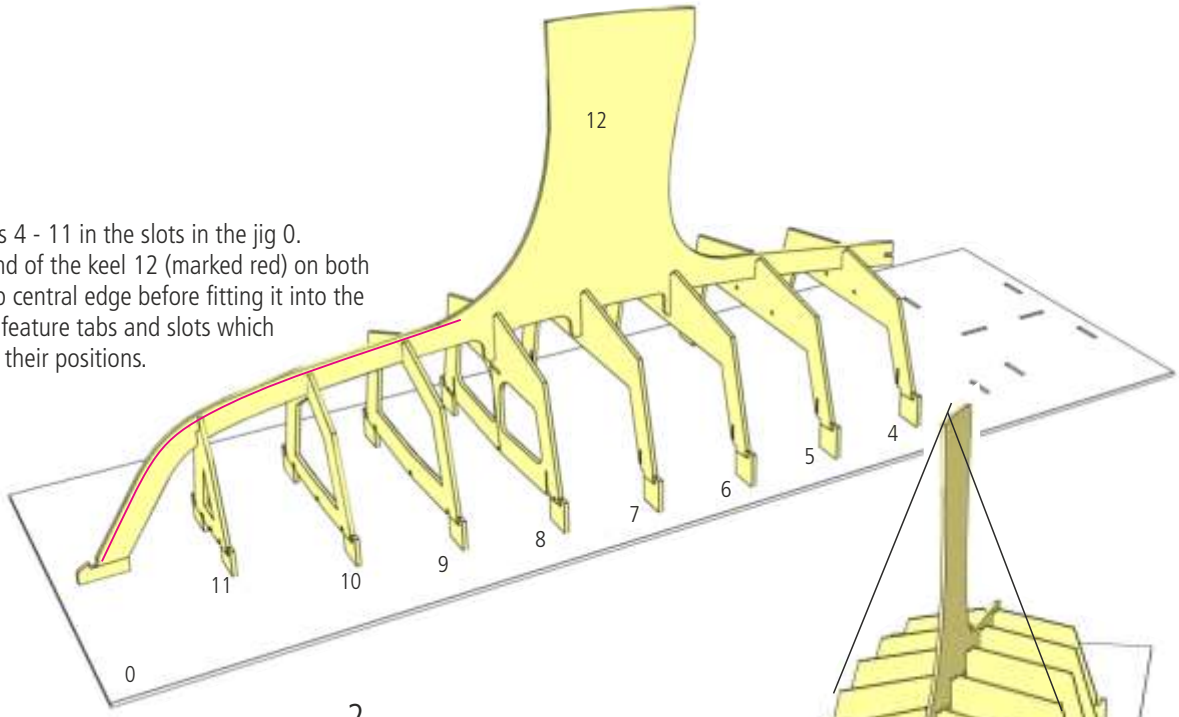
Order No. 3009/00

Introduction:
The model should be assembled following the sequence of the stages of construction described in these instructions. The laser-cut components are individually numbered. The manufacturing method leaves small tabs on some parts which have to be cut away using a thin-bladed modelling knife. The dark edges of the laser-cut parts should also be rubbed off using abrasive paper in order to obtain sound glued joints. Check that all components fit accurately before reaching for the glue, and carry out any minor trimming required. Allow all glued joints to dry out fully before starting the next stage of construction. We recommend a fast-setting waterproof white glue; please take care to prevent adhesive running onto the untreated mahogany parts and any external surfaces which will be visible on the finished model, as the glue will show up through the final painted finish. We recommend that you apply a coat of sanding sealer (Order No. 7666/02) to the mahogany components before gluing them. The whole of the boat - inside and out - must be given several coats of clear water-resistant boat lacquer before the model is placed in the water, as this waterproofs the wood and the glued joints. If you have to glue parts to areas which have already been lacquered, use two-pack adhesive for those joints.

RC functions:	Rudder
	Sail position
Specification:	
Length	approx. 810 mm
Beam	approx. 235 mm
Mast height	approx. 1050 mm
Displacement	approx. 2600 g
Mainsail	approx. 17.0 dm²
Jib	approx. 8.6 dm²
Standard servo, rudder	approx. 3 Kg
Standard servo, sails	approx. 5 Kg
Battery	approx. 1000 mAh

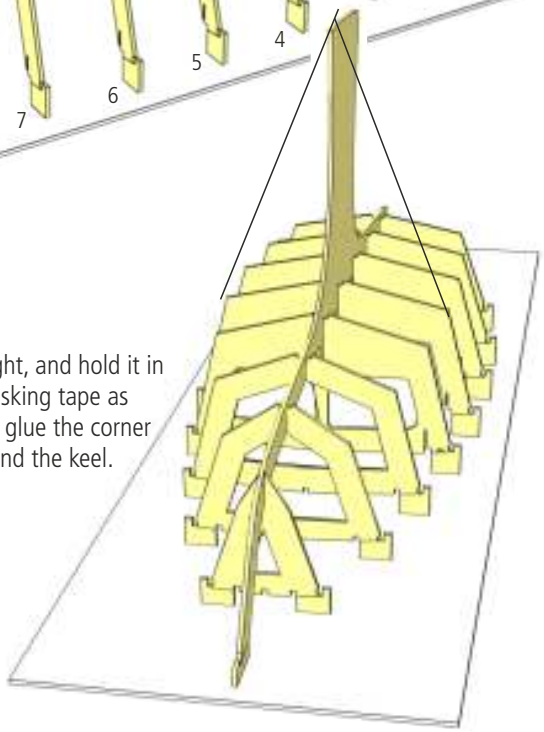
1

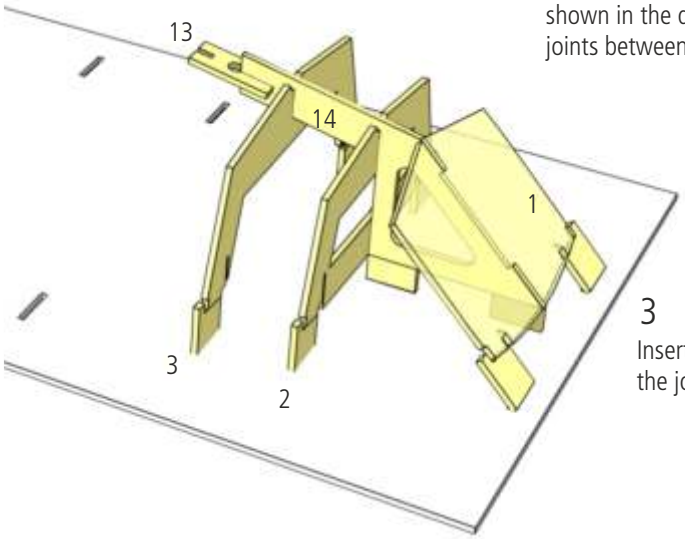
Insert the hull frames 4 - 11 in the slots in the jig 0. Chamfer the front end of the keel 12 (marked red) on both sides to form a sharp central edge before fitting it into the frames. All the parts feature tabs and slots which automatically define their positions.



2

Set the keel fin exactly upright, and hold it in that position with paper masking tape as shown in the drawing. Now glue the corner joints between the frames and the keel.



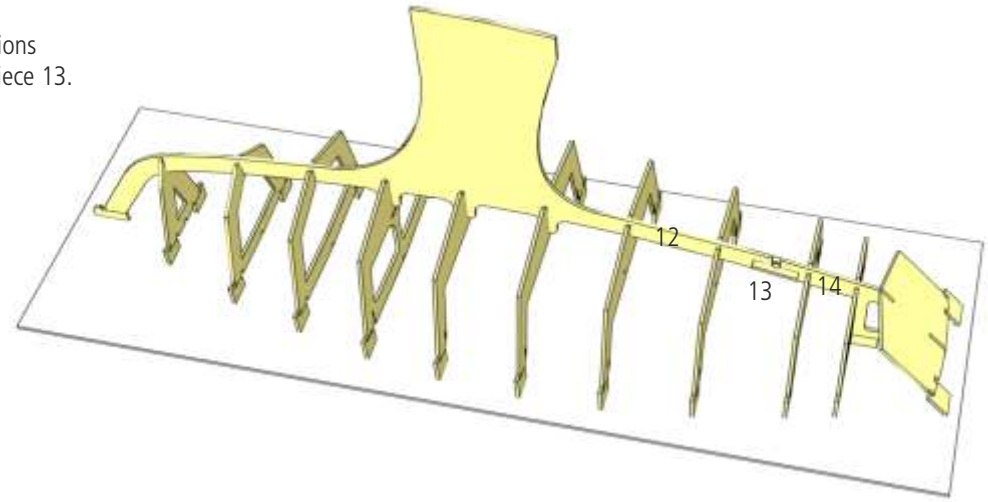


3

Insert the frames 2 and 3 in the jig, add the rear keel section 14 and glue the joints. Glue the frame 1 and the connecting piece 13 to the structure.

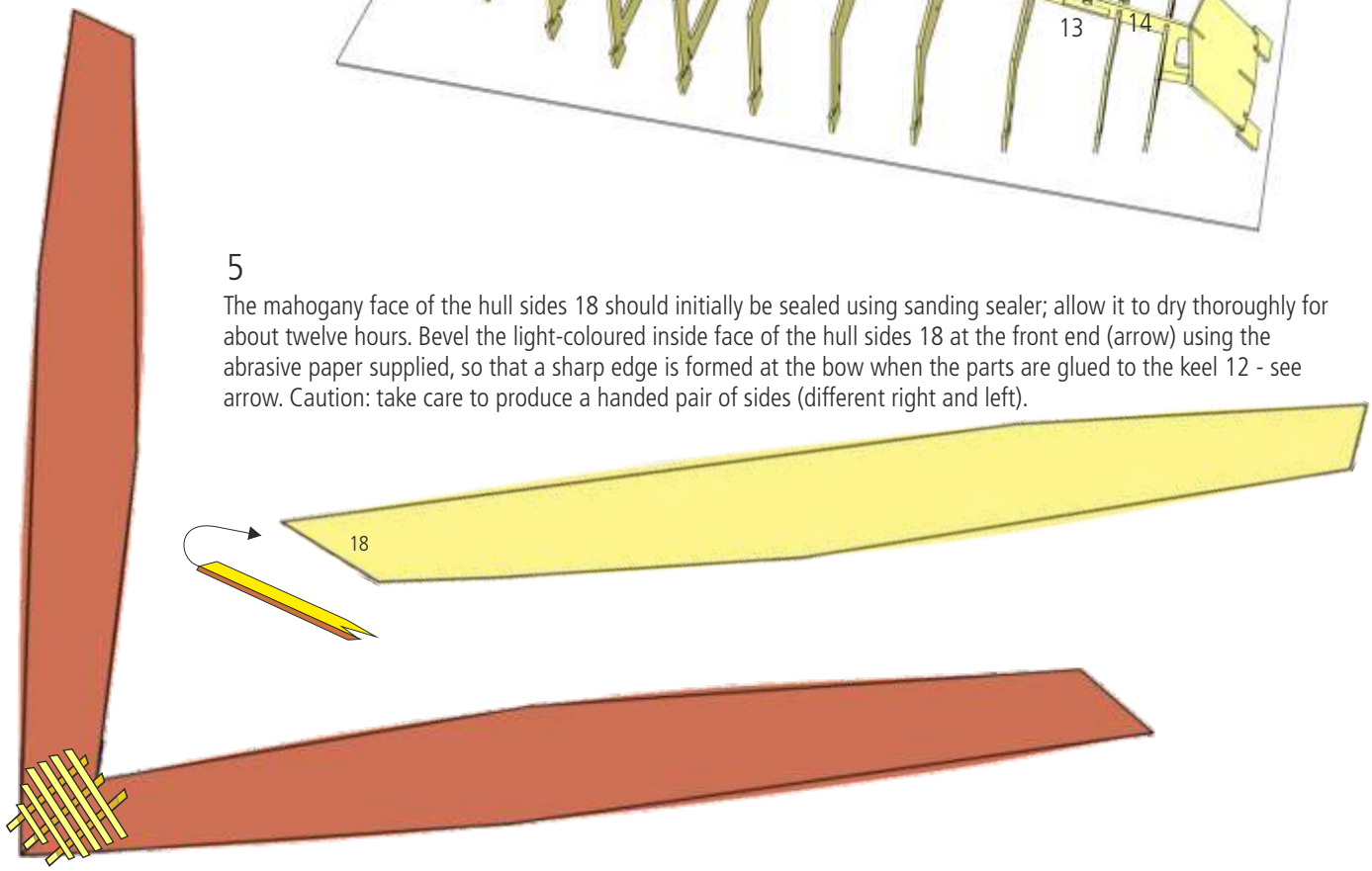
4

Glue the front and rear hull sections together using the connecting piece 13.



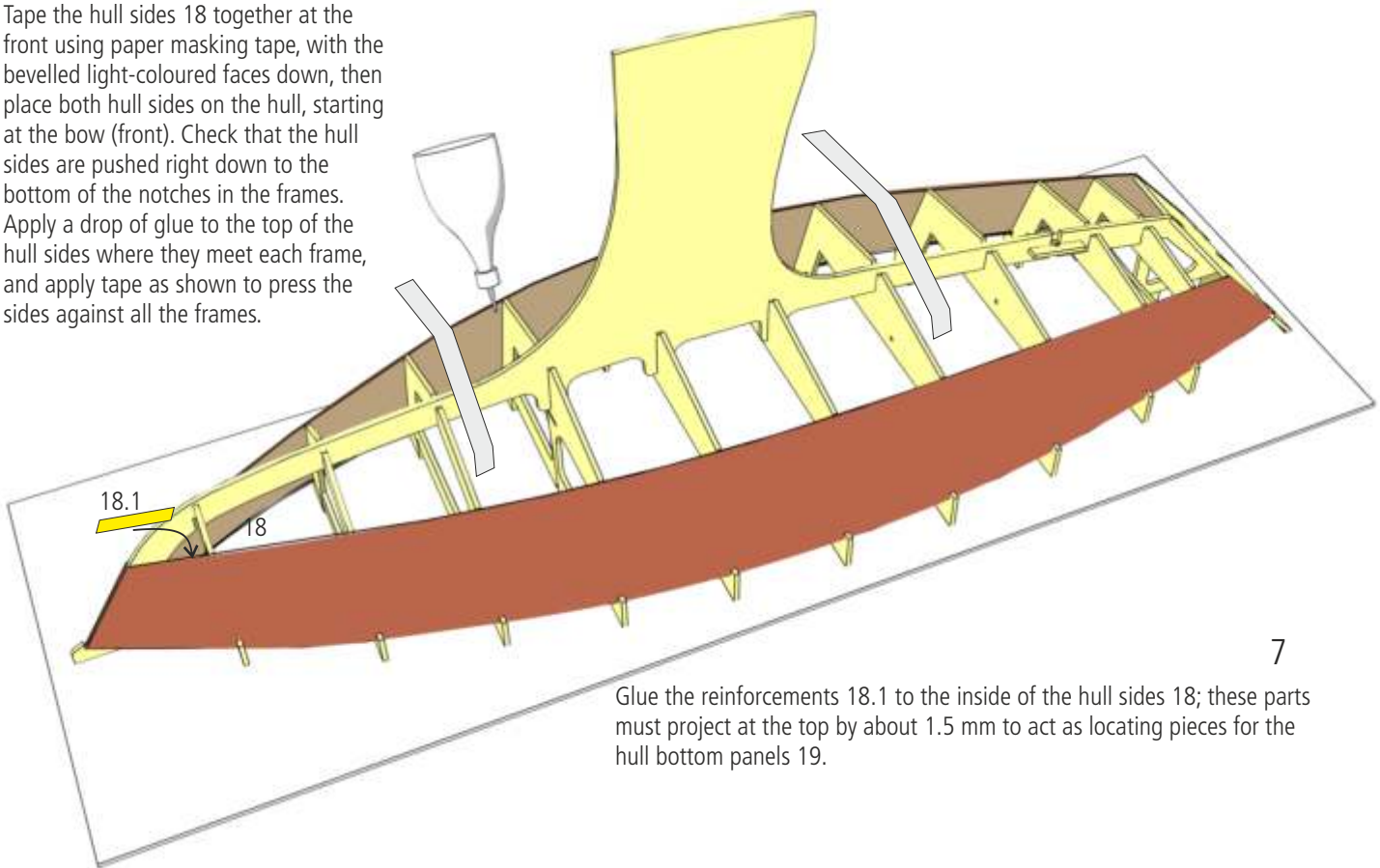
5

The mahogany face of the hull sides 18 should initially be sealed using sanding sealer; allow it to dry thoroughly for about twelve hours. Bevel the light-coloured inside face of the hull sides 18 at the front end (arrow) using the abrasive paper supplied, so that a sharp edge is formed at the bow when the parts are glued to the keel 12 - see arrow. Caution: take care to produce a handed pair of sides (different right and left).



6

Tape the hull sides 18 together at the front using paper masking tape, with the bevelled light-coloured faces down, then place both hull sides on the hull, starting at the bow (front). Check that the hull sides are pushed right down to the bottom of the notches in the frames. Apply a drop of glue to the top of the hull sides where they meet each frame, and apply tape as shown to press the sides against all the frames.



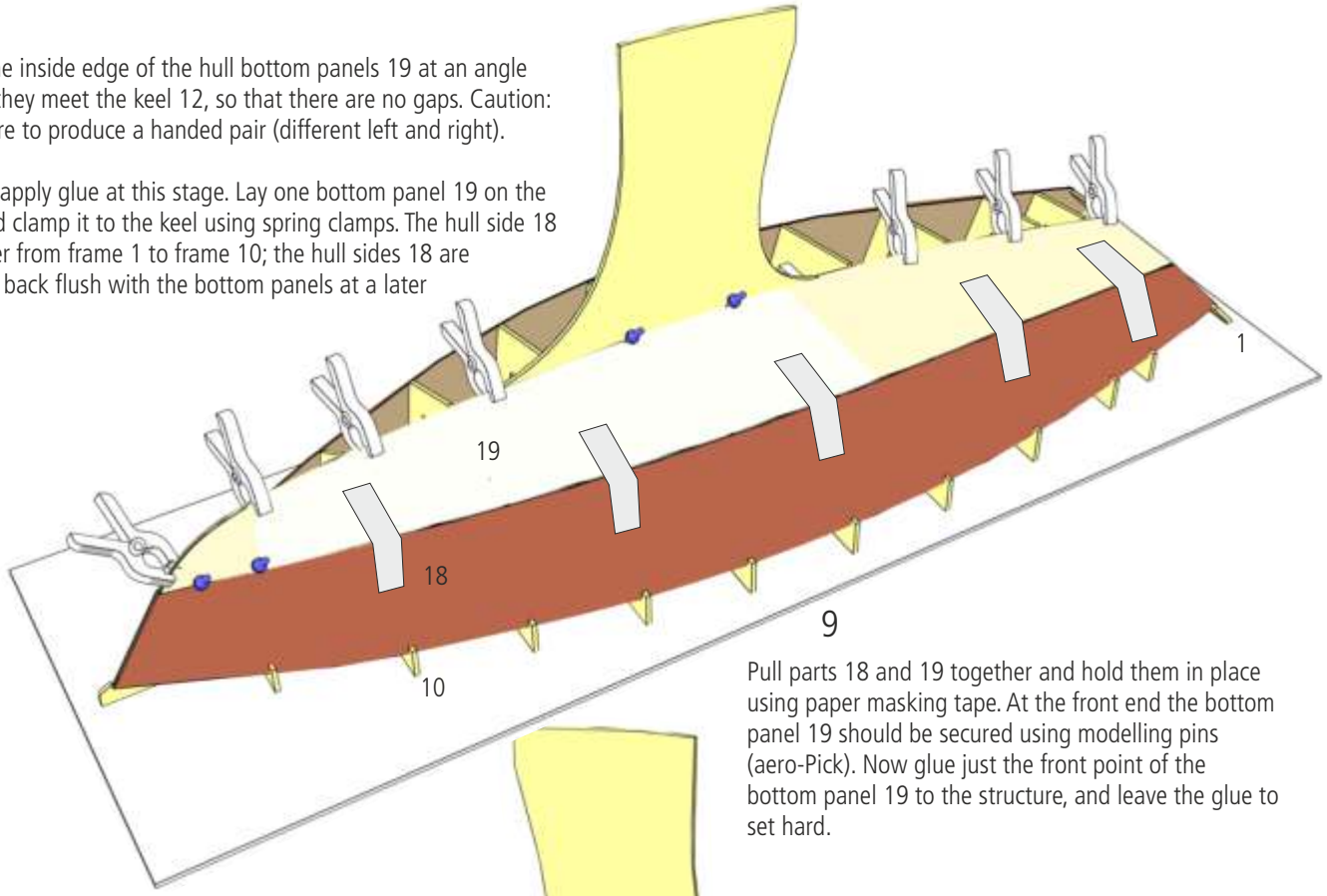
7

Glue the reinforcements 18.1 to the inside of the hull sides 18; these parts must project at the top by about 1.5 mm to act as locating pieces for the hull bottom panels 19.

8

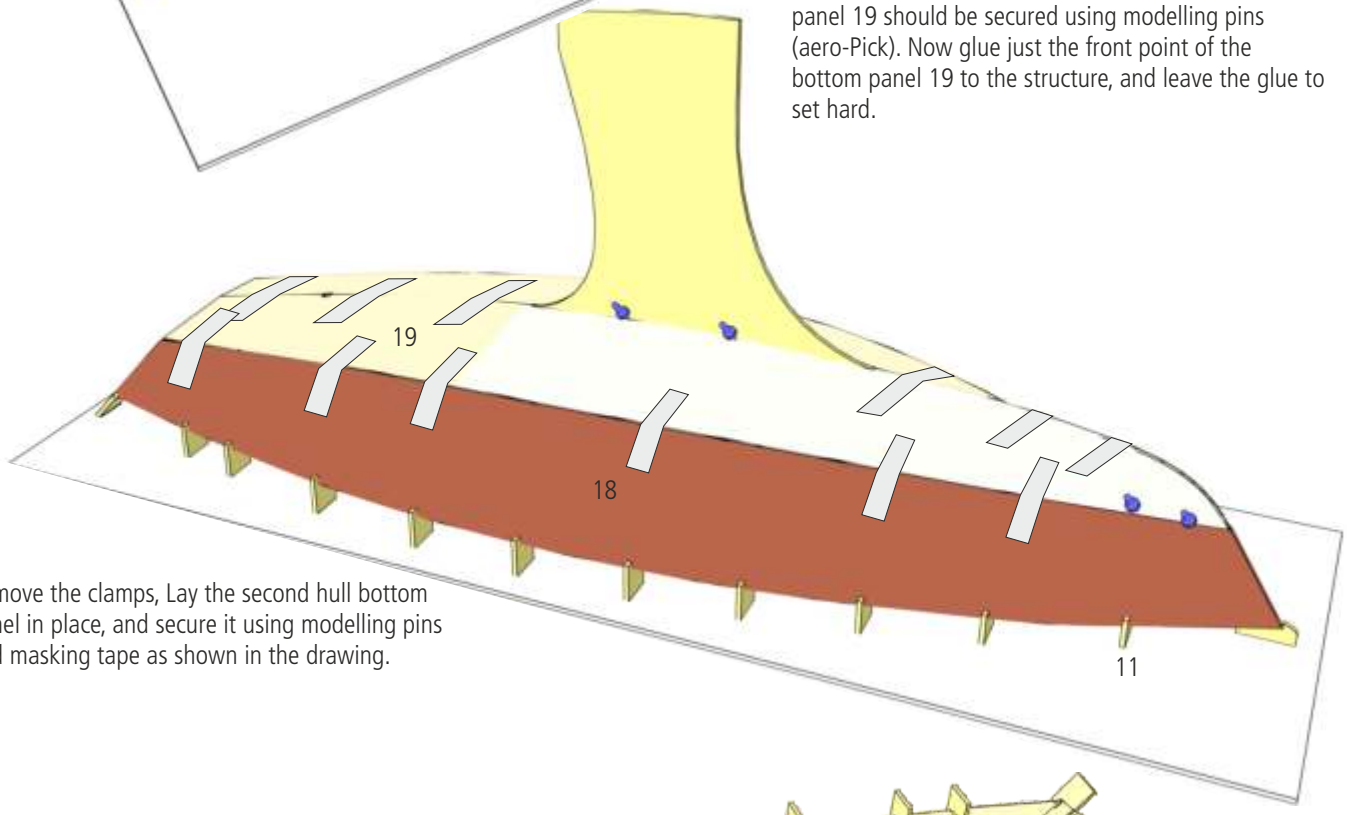
Sand the inside edge of the hull bottom panels 19 at an angle where they meet the keel 12, so that there are no gaps. Caution: take care to produce a handed pair (different left and right).

Do not apply glue at this stage. Lay one bottom panel 19 on the hull and clamp it to the keel using spring clamps. The hull side 18 is higher from frame 1 to frame 10; the hull sides 18 are sanded back flush with the bottom panels at a later stage.



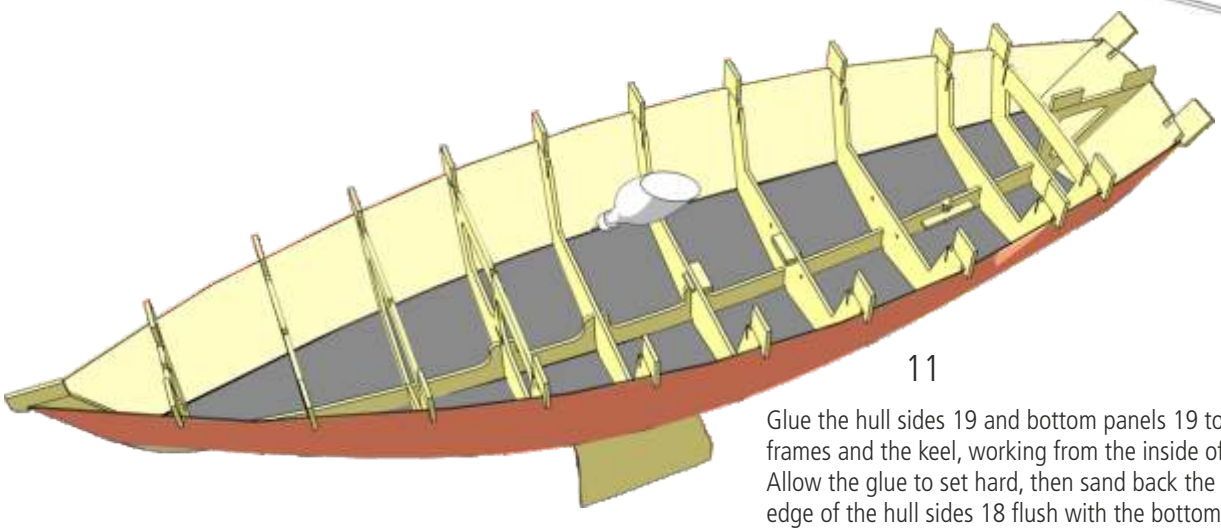
9

Pull parts 18 and 19 together and hold them in place using paper masking tape. At the front end the bottom panel 19 should be secured using modelling pins (aero-Pick). Now glue just the front point of the bottom panel 19 to the structure, and leave the glue to set hard.



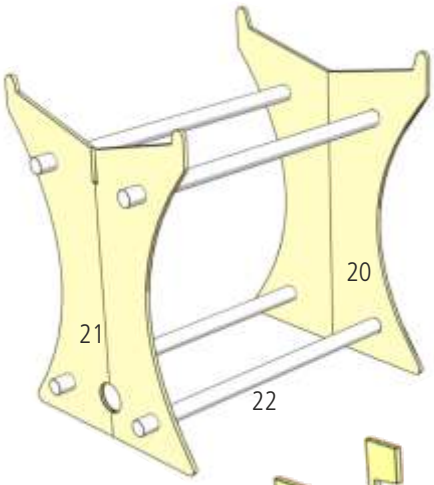
10

Remove the clamps, Lay the second hull bottom panel in place, and secure it using modelling pins and masking tape as shown in the drawing.



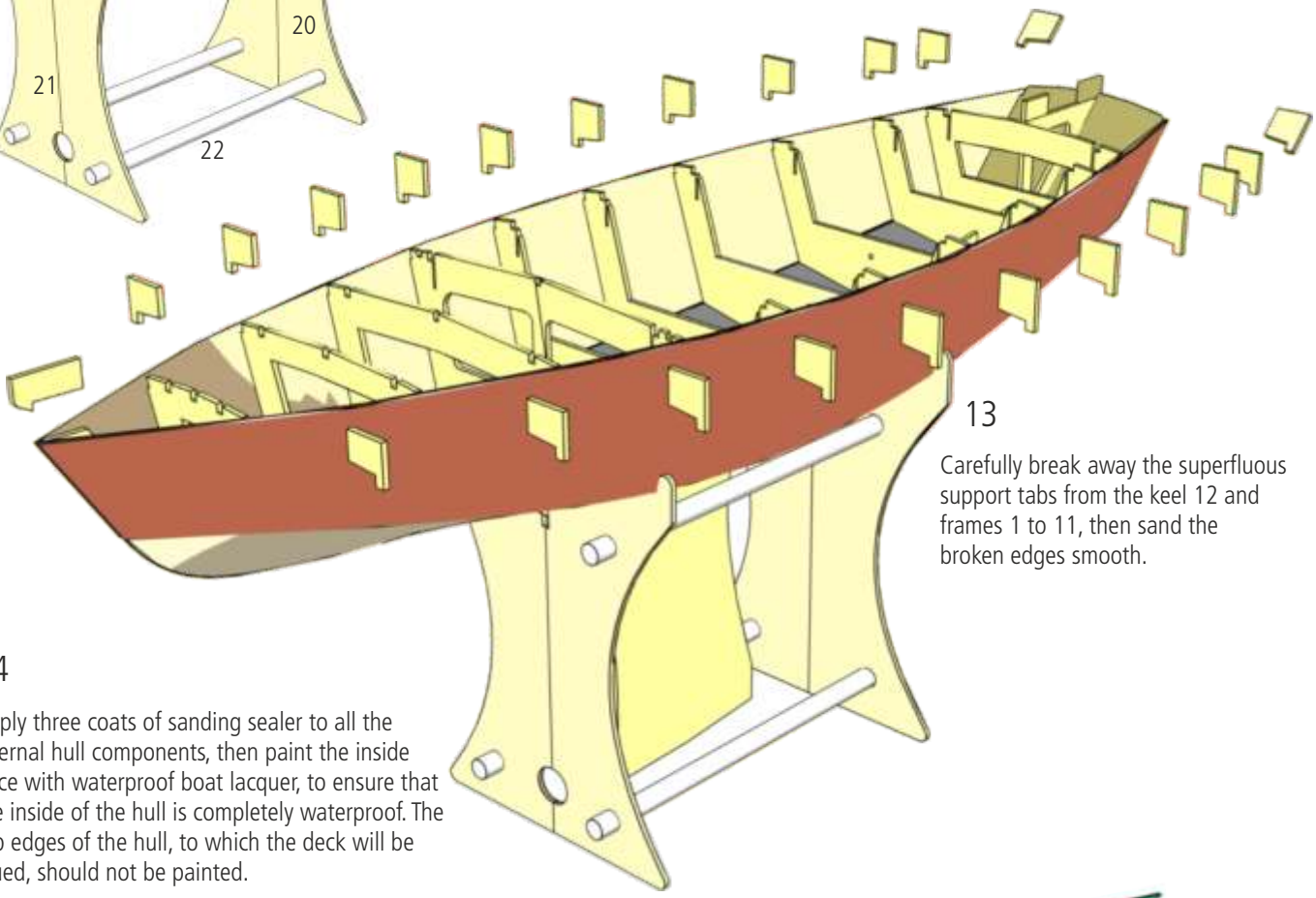
11

Glue the hull sides 19 and bottom panels 19 to the hull frames and the keel, working from the inside of the hull. Allow the glue to set hard, then sand back the projecting edge of the hull sides 18 flush with the bottom panels 19.



12

At this stage the boatstand should be assembled by gluing parts 20, 21 and 22 together. The hull should now be placed in the stand and left there for all further construction work.

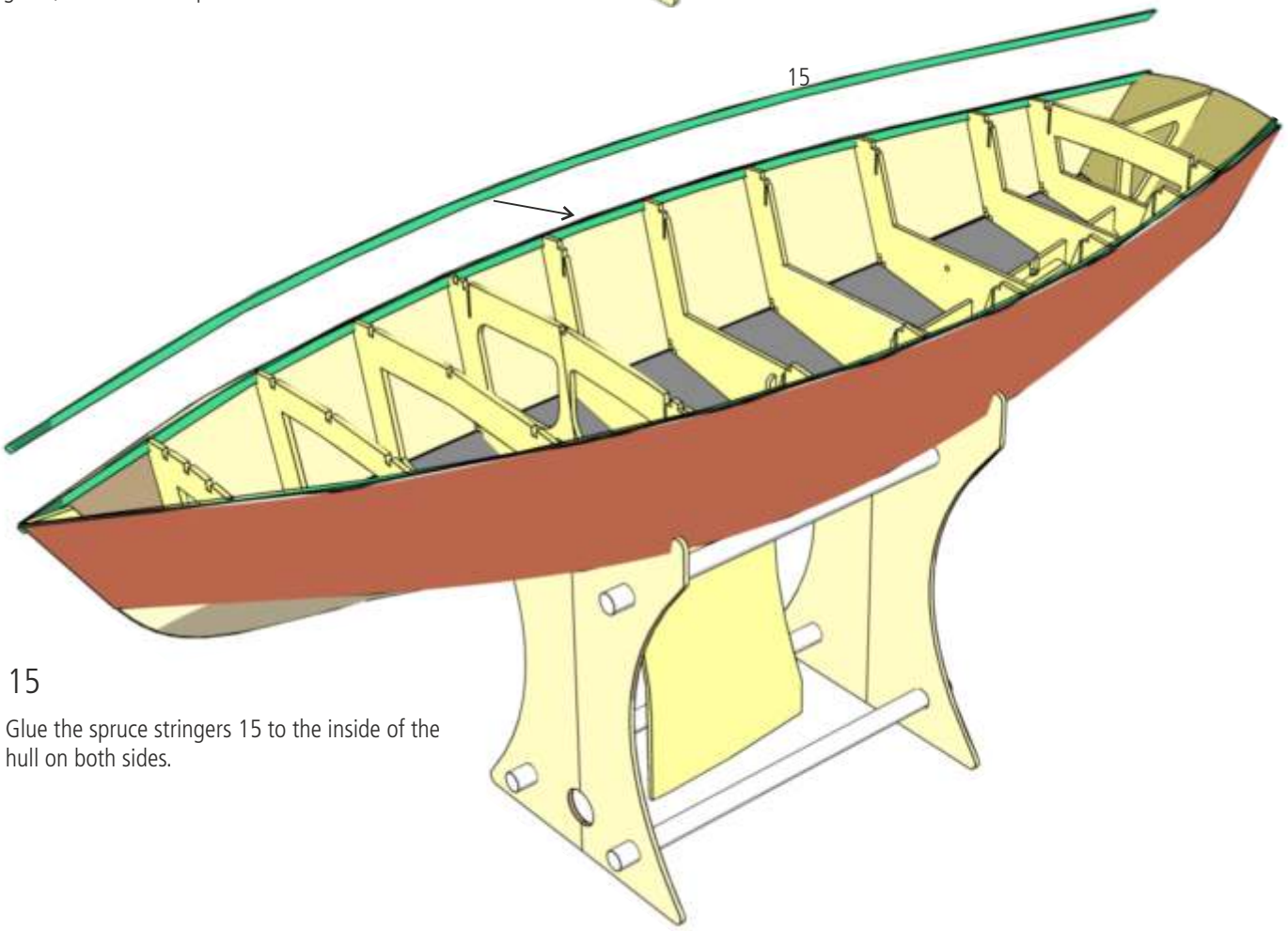


13

Carefully break away the superfluous support tabs from the keel 12 and frames 1 to 11, then sand the broken edges smooth.

14

Apply three coats of sanding sealer to all the internal hull components, then paint the inside once with waterproof boat lacquer, to ensure that the inside of the hull is completely waterproof. The top edges of the hull, to which the deck will be glued, should not be painted.

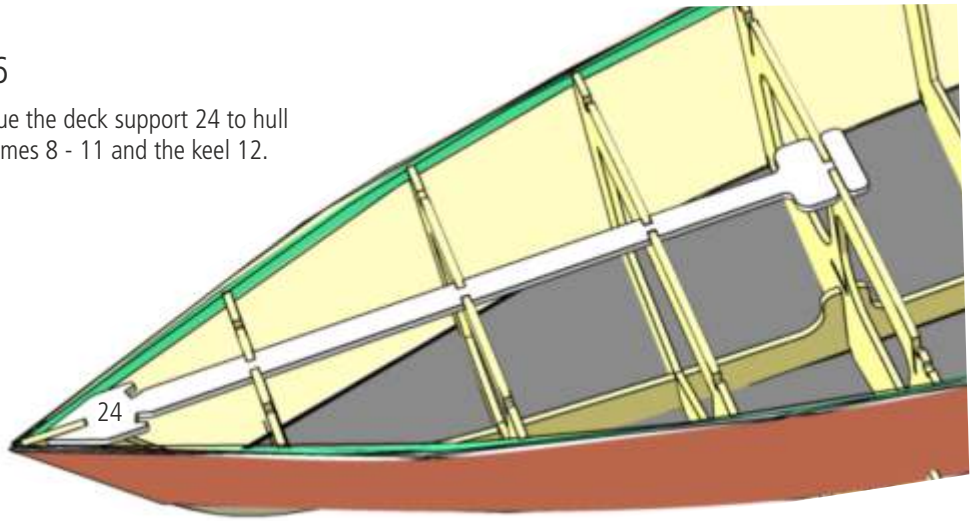


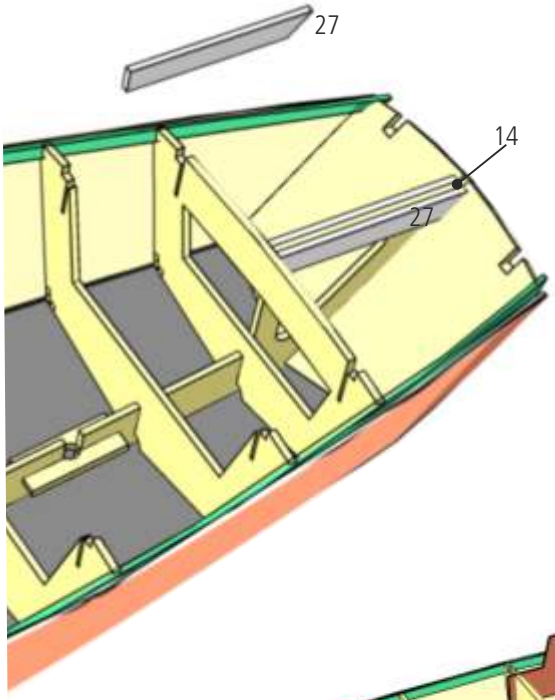
15

Glue the spruce stringers 15 to the inside of the hull on both sides.

16

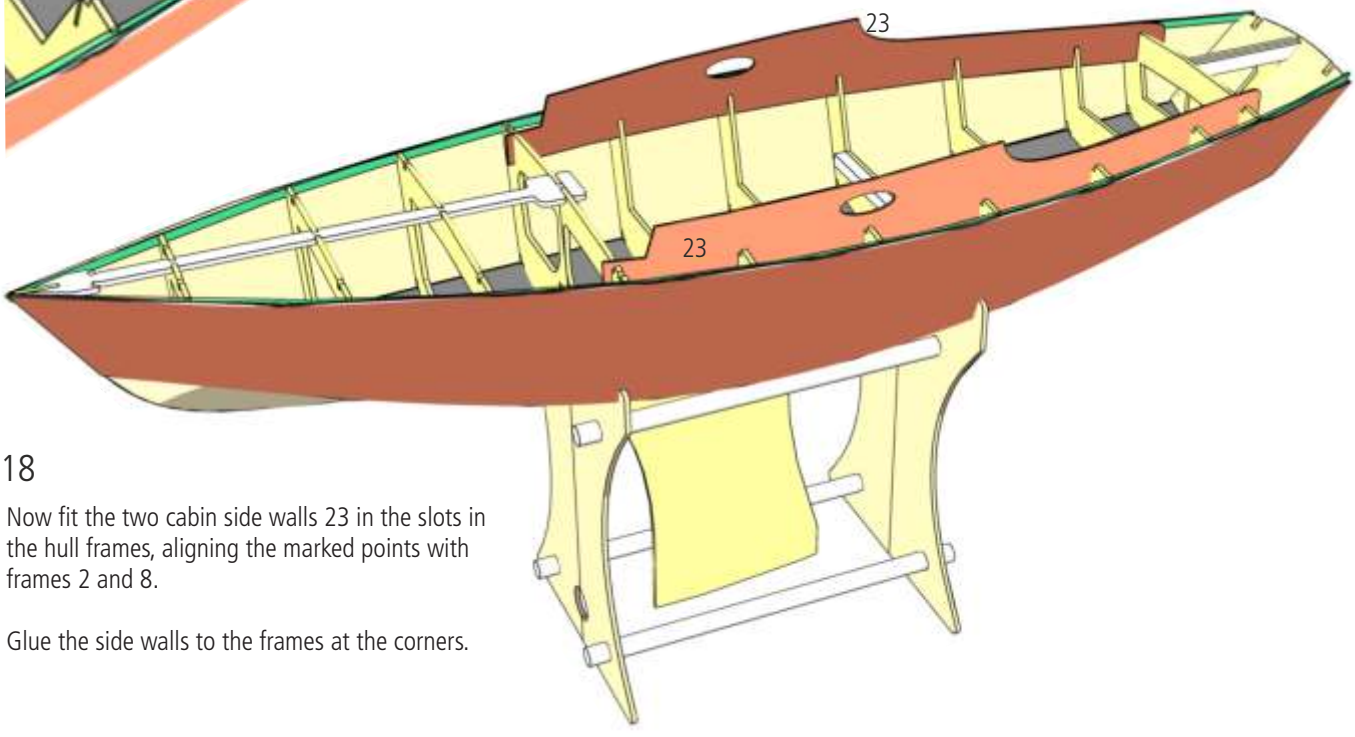
Glue the deck support 24 to hull frames 8 - 11 and the keel 12.





17

Glue the rear deck support reinforcements 27 to part 14.



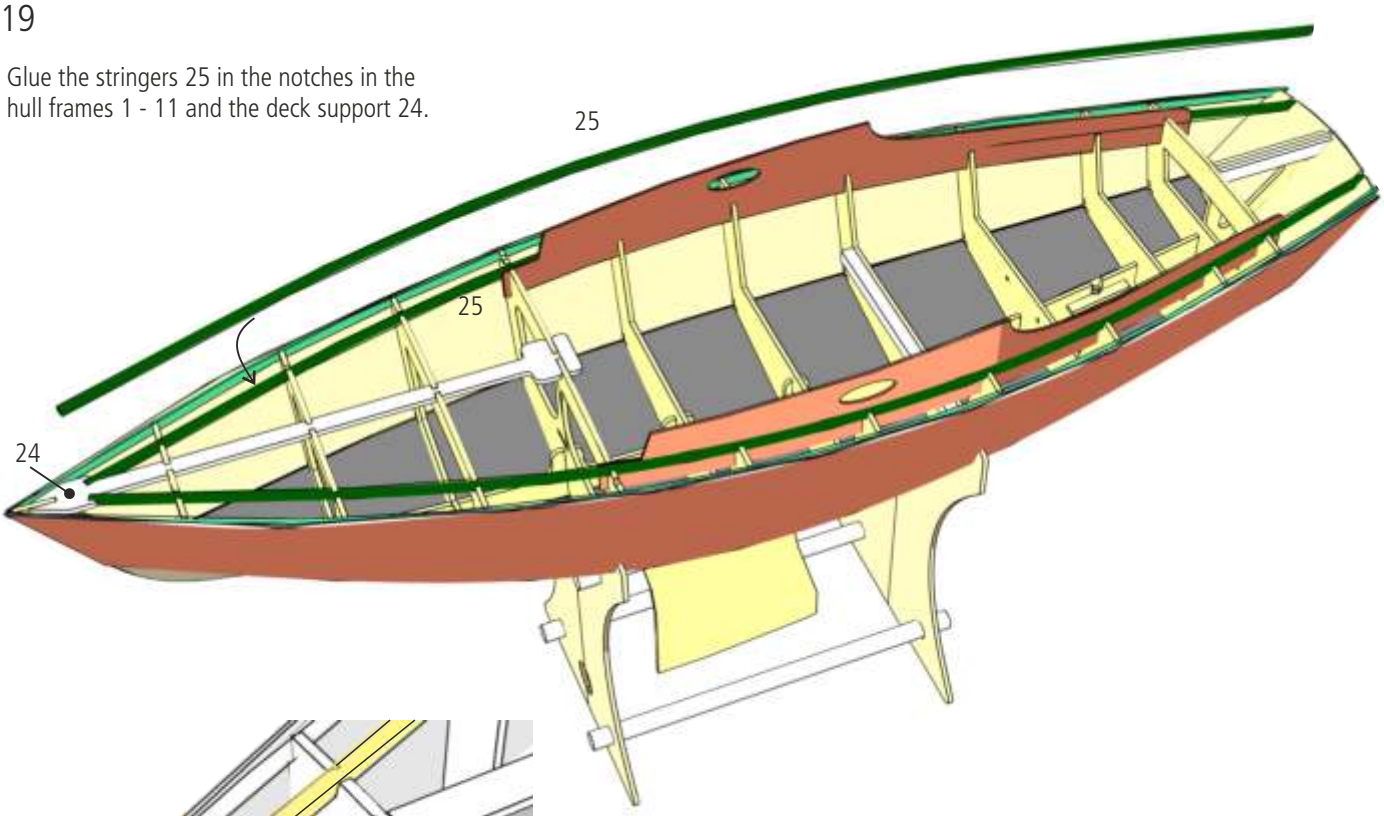
18

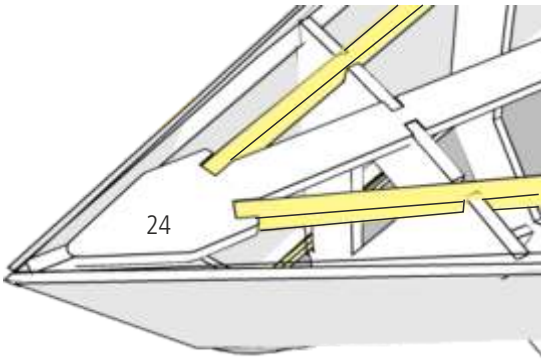
Now fit the two cabin side walls 23 in the slots in the hull frames, aligning the marked points with frames 2 and 8.

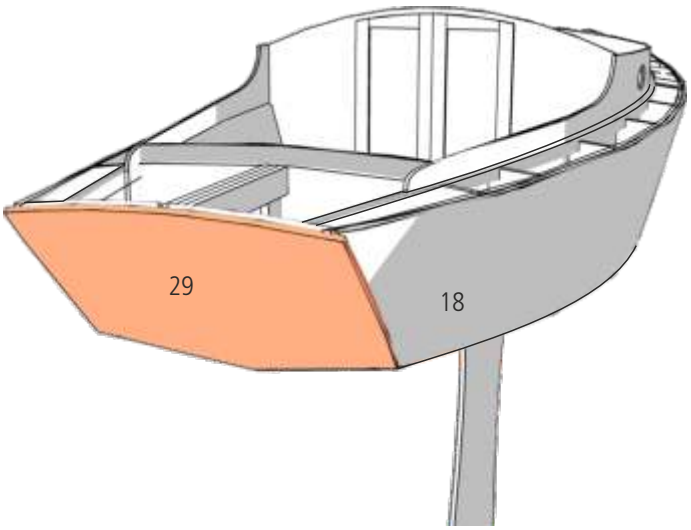
Glue the side walls to the frames at the corners.

19

Glue the stringers 25 in the notches in the hull frames 1 - 11 and the deck support 24.







20

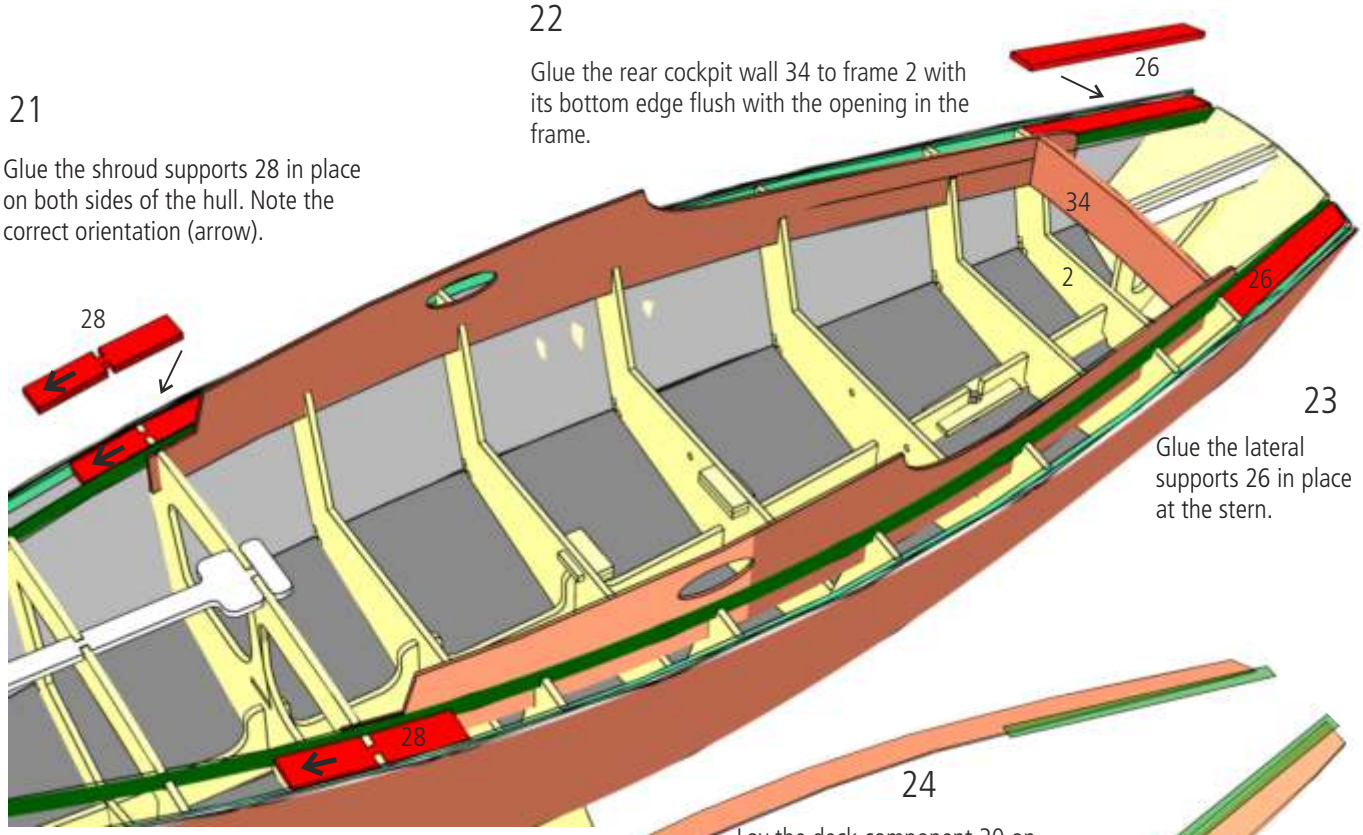
Glue the transom 29 to the rear face of frame 1; it must overlap the hull sides 18.

21

Glue the shroud supports 28 in place on both sides of the hull. Note the correct orientation (arrow).

22

Glue the rear cockpit wall 34 to frame 2 with its bottom edge flush with the opening in the frame.

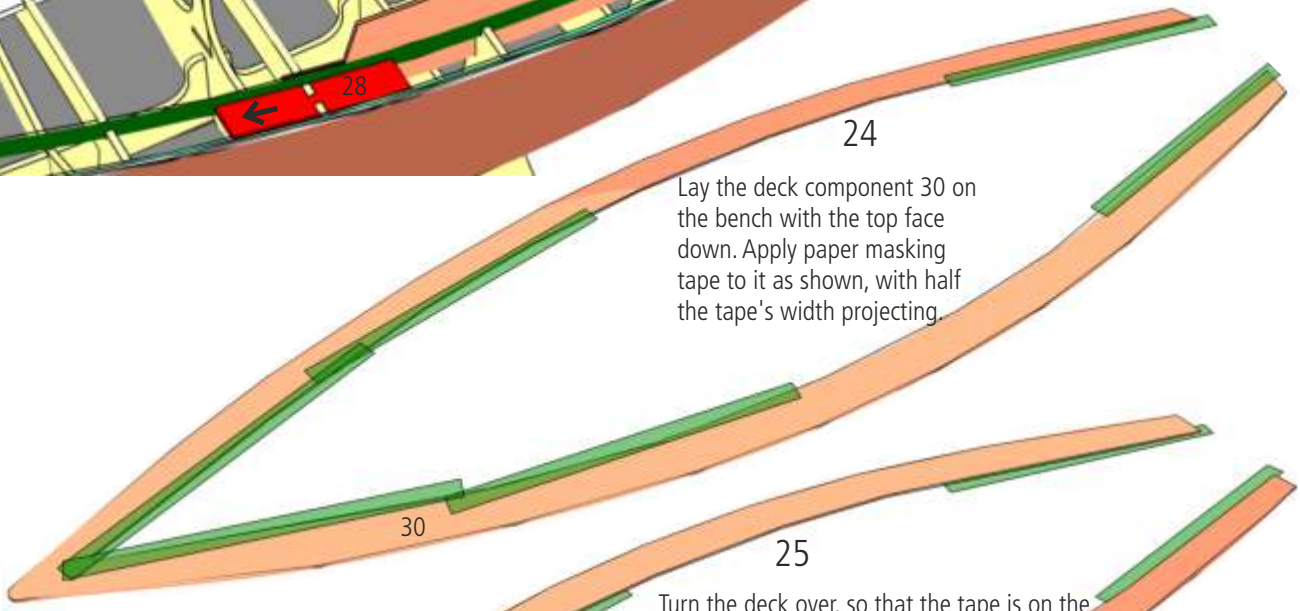


23

Glue the lateral supports 26 in place at the stern.

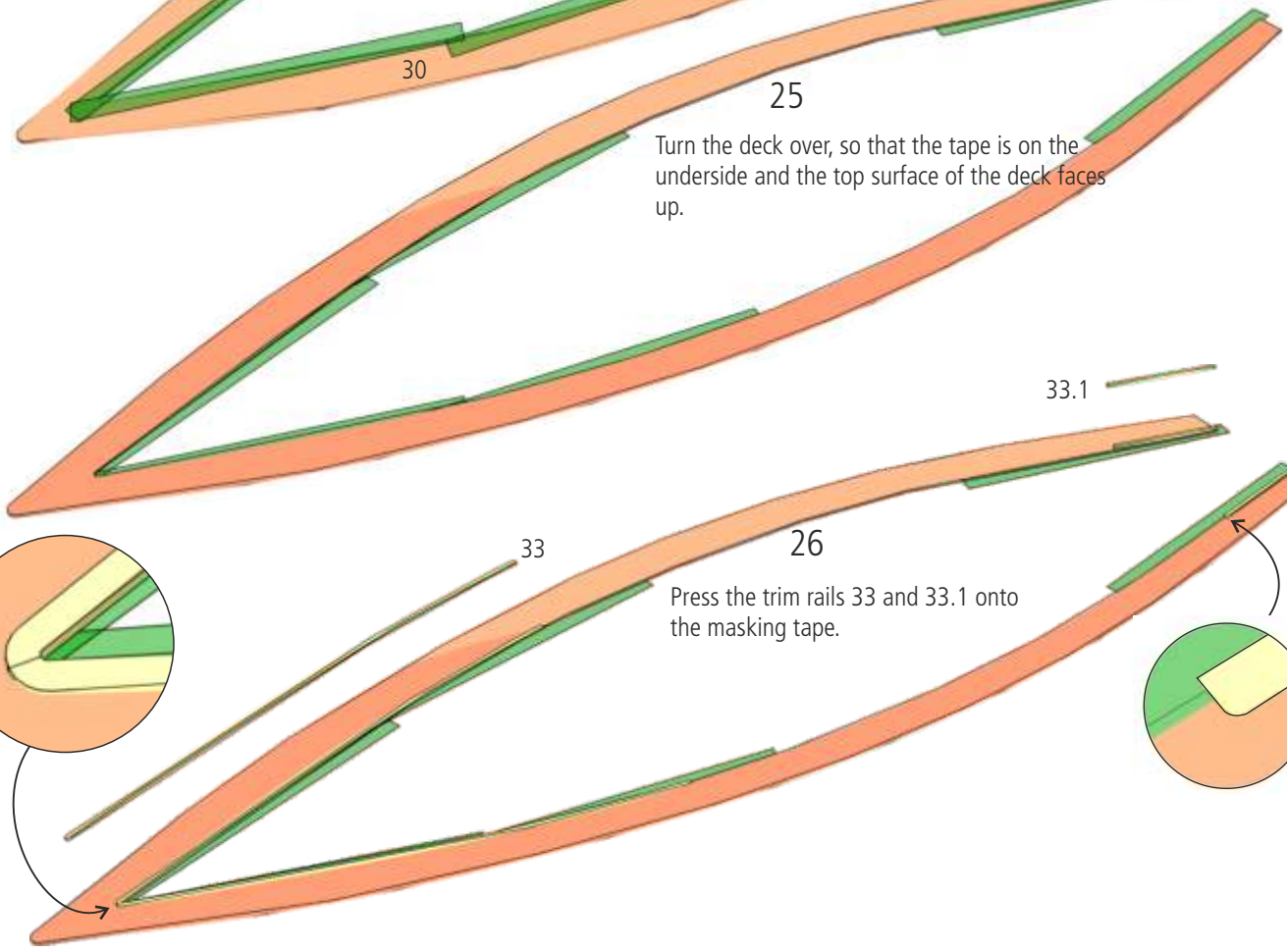
24

Lay the deck component 30 on the bench with the top face down. Apply paper masking tape to it as shown, with half the tape's width projecting.



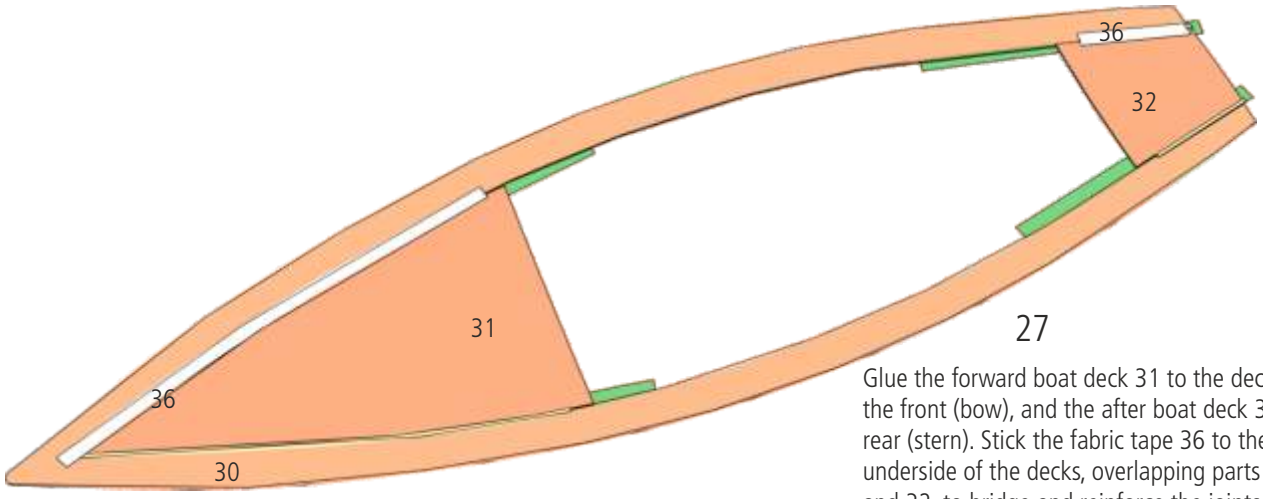
25

Turn the deck over, so that the tape is on the underside and the top surface of the deck faces up.



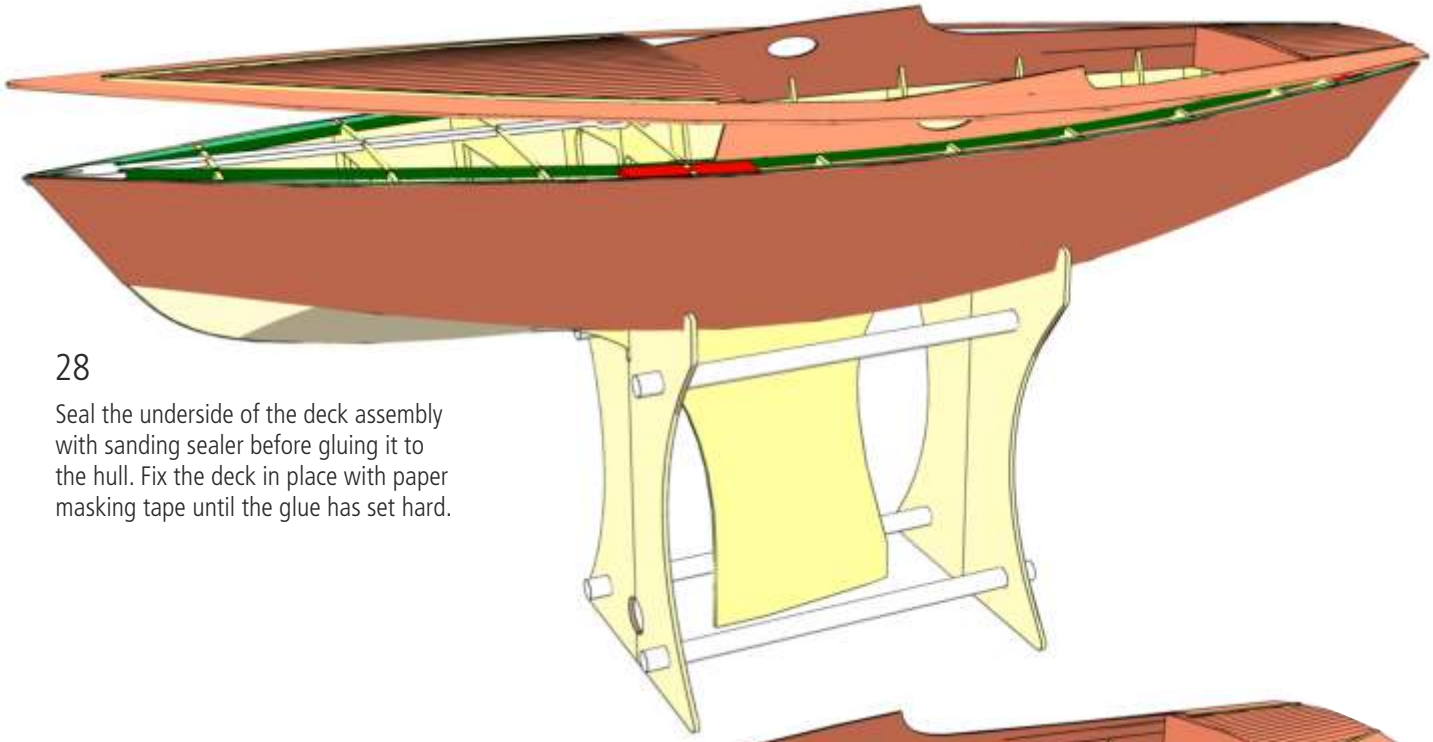
26

Press the trim rails 33 and 33.1 onto the masking tape.



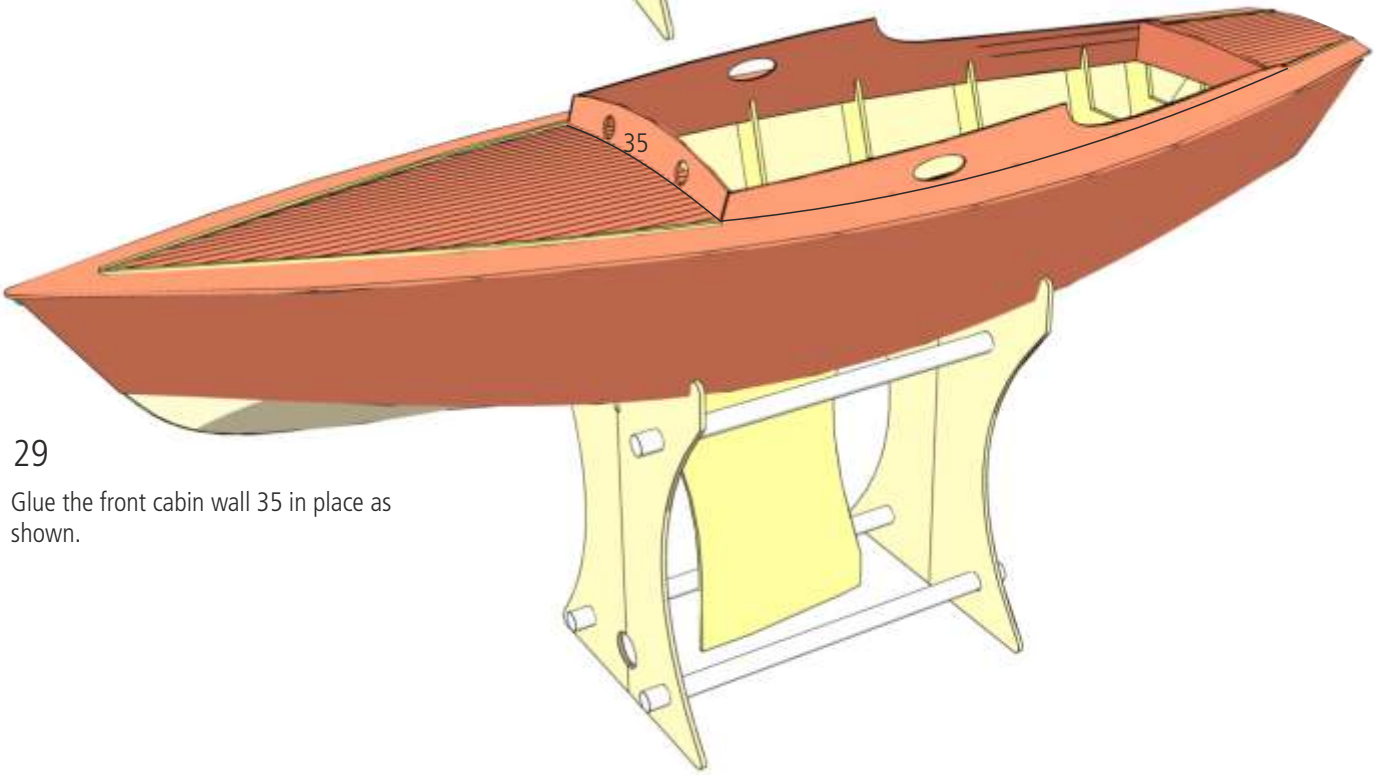
27

Glue the forward boat deck 31 to the deck 30 at the front (bow), and the after boat deck 32 at the rear (stern). Stick the fabric tape 36 to the underside of the decks, overlapping parts 30, 31 and 32, to bridge and reinforce the joints. Leave the glue to set hard, then turn the completed deck over.



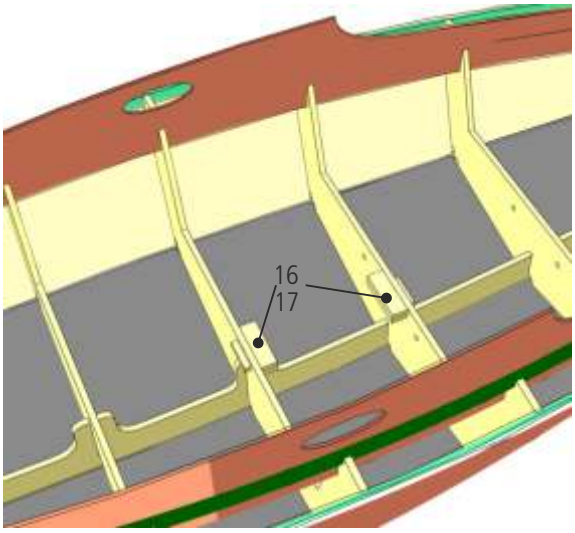
28

Seal the underside of the deck assembly with sanding sealer before gluing it to the hull. Fix the deck in place with paper masking tape until the glue has set hard.



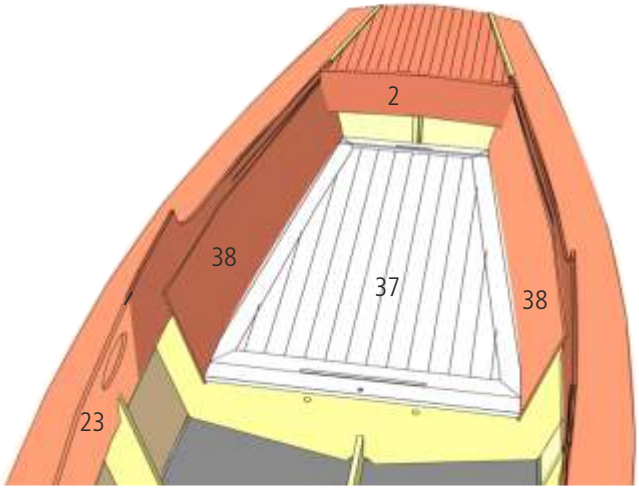
29

Glue the front cabin wall 35 in place as shown.



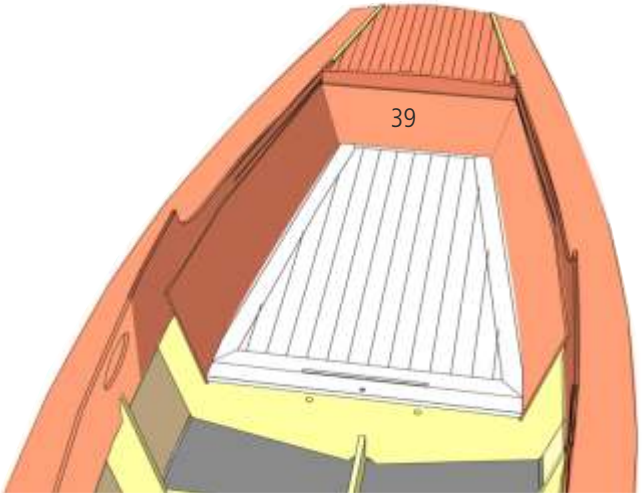
30

Glue together the supports from parts 16 + 17, and glue these assemblies in the notches in frames 5 and 6.



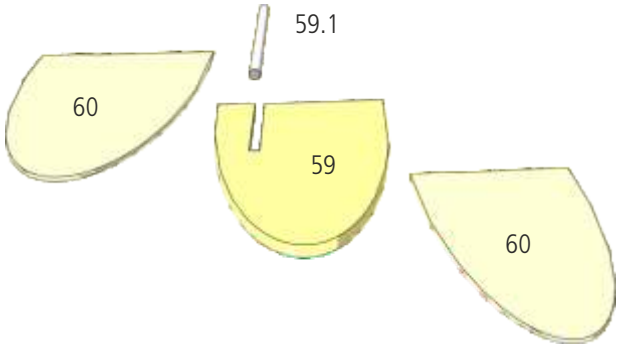
31

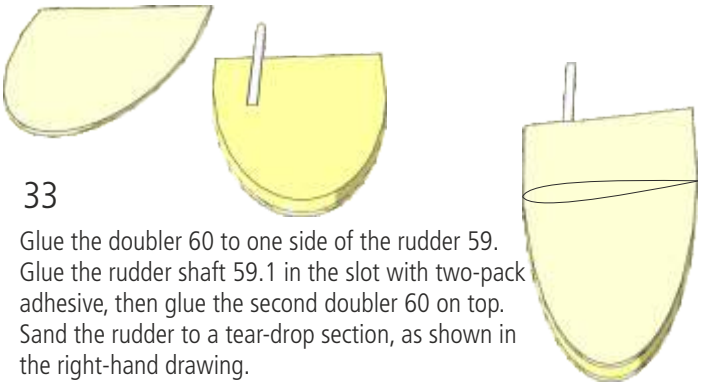
Install the cockpit sides 38 in the hull and slide them towards the stern as far as they will go; they should end flush at the top, and engage in the opening in frame 2 at the bottom. Fit the cockpit floor 37, push it right down and screw it to parts 16 + 17 at the front. You will find marks on the cabin sides 23 which indicate the level of the top of the cockpit sides 38.



32

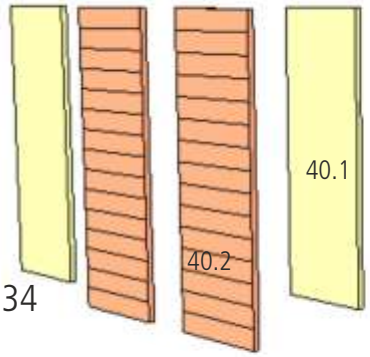
Fit the rear cockpit panel 39, set it vertical, and glue it in place.





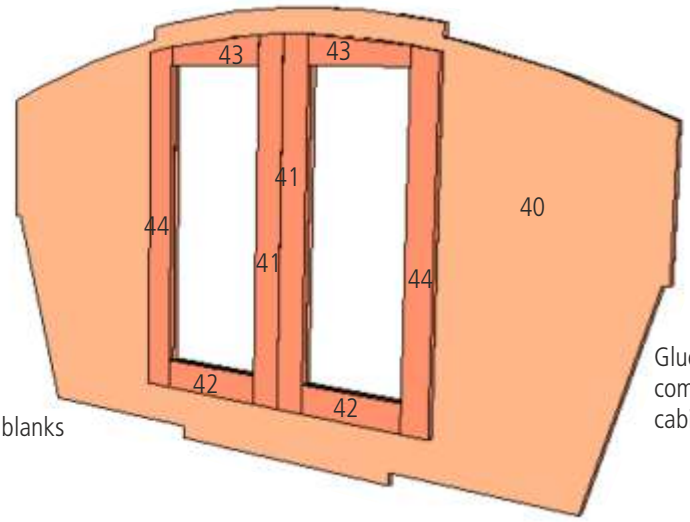
33

Glue the doubler 60 to one side of the rudder 59. Glue the rudder shaft 59.1 in the slot with two-pack adhesive, then glue the second doubler 60 on top. Sand the rudder to a tear-drop section, as shown in the right-hand drawing.



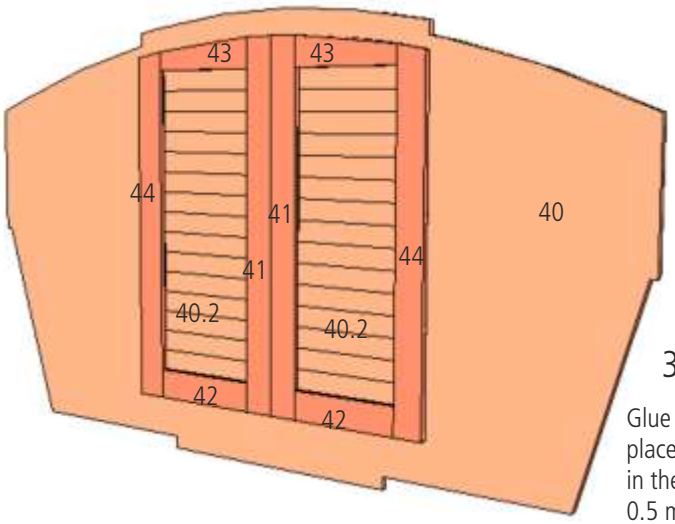
34

Glue the louvre panels 40.2 to the door blanks 40.1.



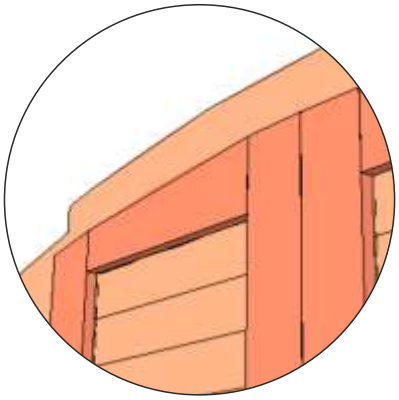
35

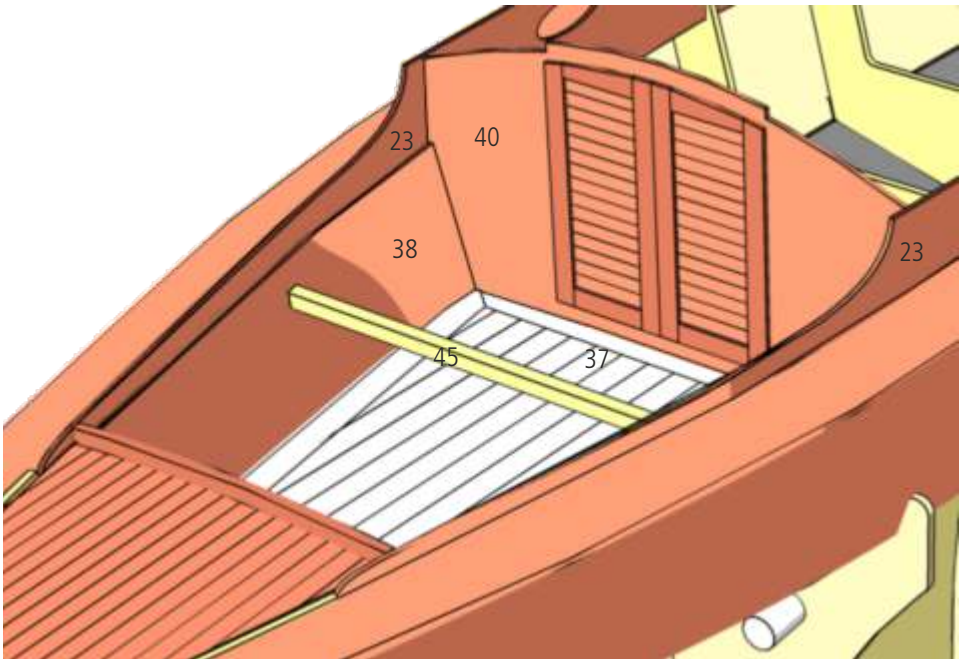
Glue the door frame components 41 - 44 to the cabin wall 40.



36

Glue the louvre panels in place; they should lie recessed in the door frames by about 0.5 mm.





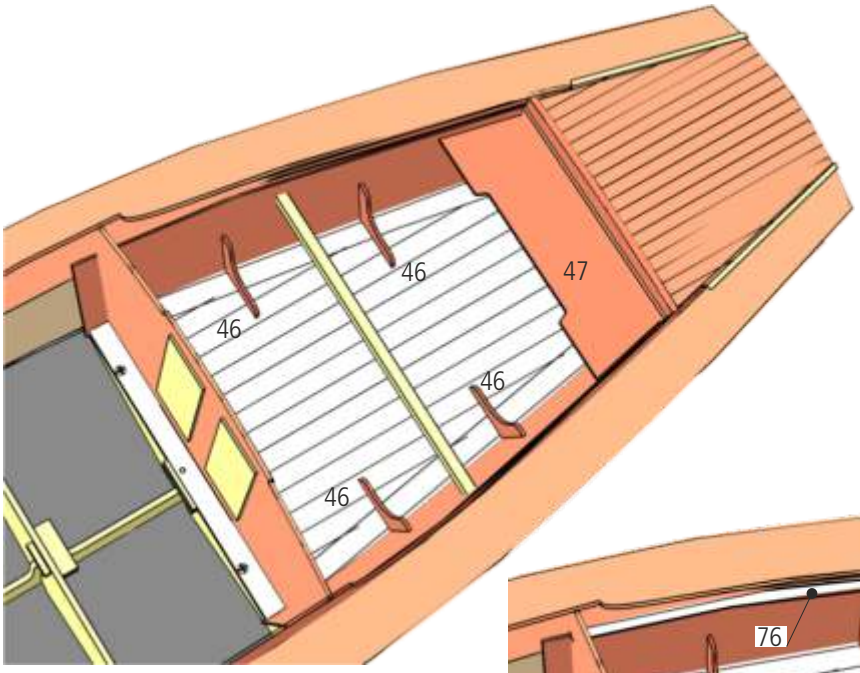
37

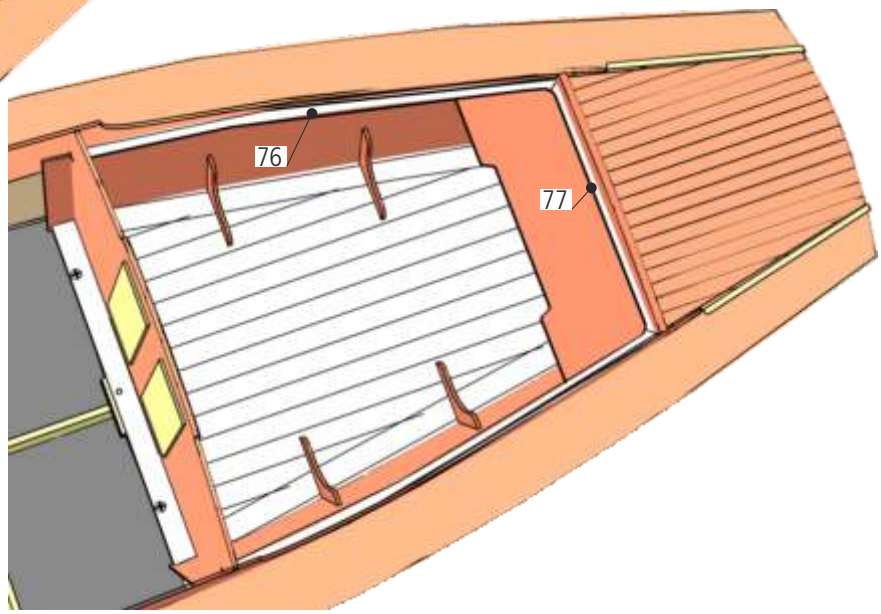
Press the cockpit sides 38 outwards using the spacer strip 45, and glue the cabin wall 40 to the cockpit floor 37 and the cockpit sides 38. There are reference marks on the cabin sides 23 which indicate the position of the cabin wall 40.

Caution: do not glue the cabin wall to the cabin sides 23.

38

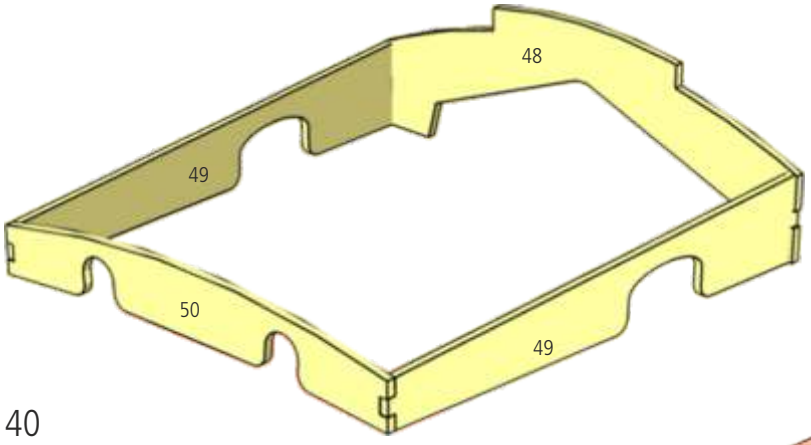
Glue the knees 46 and the bench seat 47 in the cockpit. Glue parts 76 and 77 in place to form the cockpit edge rails.





39

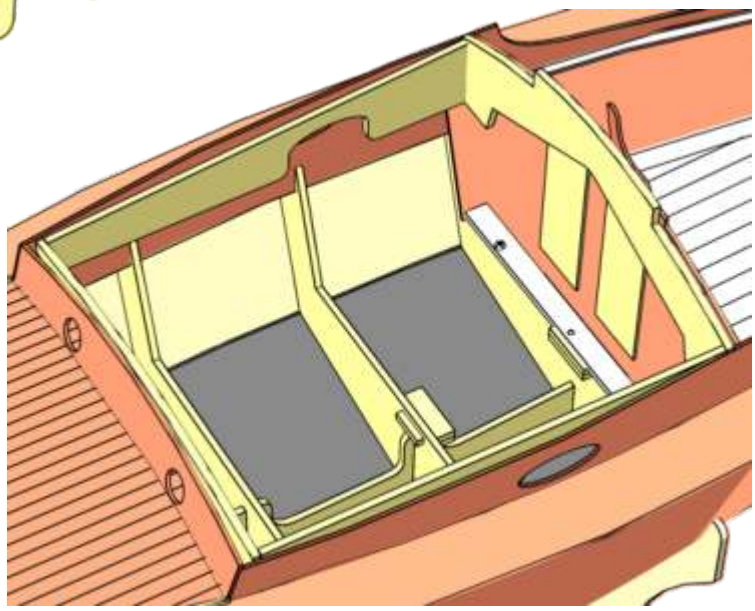
The frame for the detachable roof is assembled from parts 48, 49 and 50.

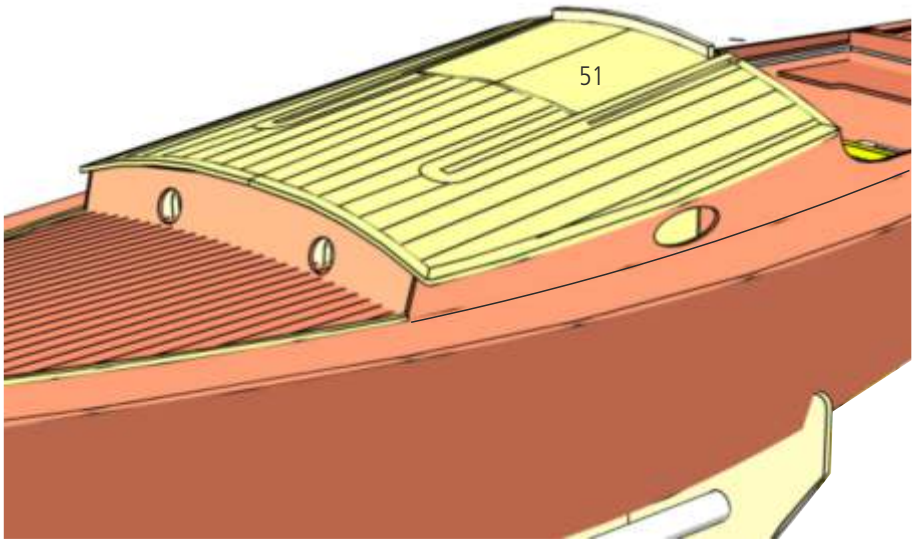


40

To ensure that the roof frame retains the correct shape, it should be fitted on the model while the glue is drying. To prevent it becoming stuck to the structure, apply narrow strips of adhesive tape over the glued joints before sliding it into place; this effectively ensures that the frame can be removed again later.

Tape can also be applied at any other point where there is a danger of parts becoming glued to the structure; this also makes it easier to remove the completed assemblies again later. It is important to apply sufficient glue, but not an excessive amount.

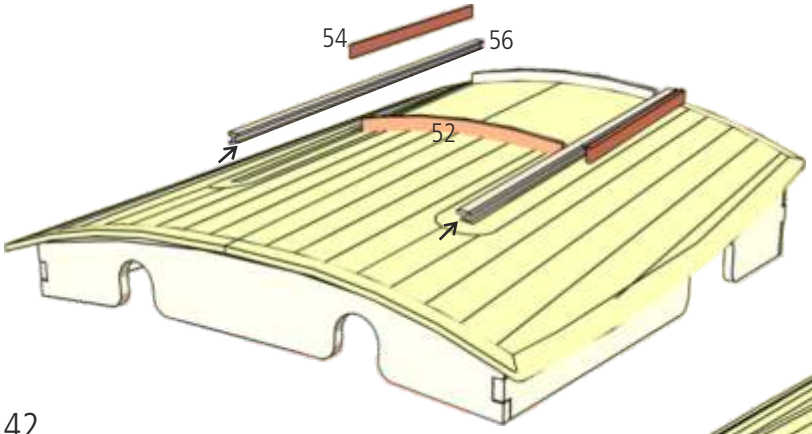


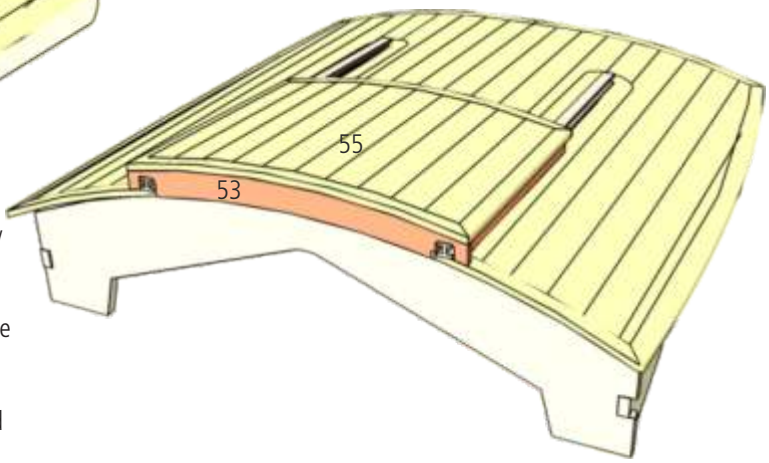


41

When the glued joints of the roof frame have set hard, the cabin roof 51 can be prepared and fitted. There is a danger that the panel will spit along the engraved lines, but this can be avoided by lightly moistening the top face beforehand. Alternatively low-tack paper masking tape can be applied across the width of the roof.

When subsequently removing the tape, peel it off slowly, following the grain to avoid tearing the wood. Now position the cabin roof as shown, and check carefully that there are no gaps along the joints. Glue the roof in place, securing it with masking tape stretched from one side of the hull over the top and down the other side.

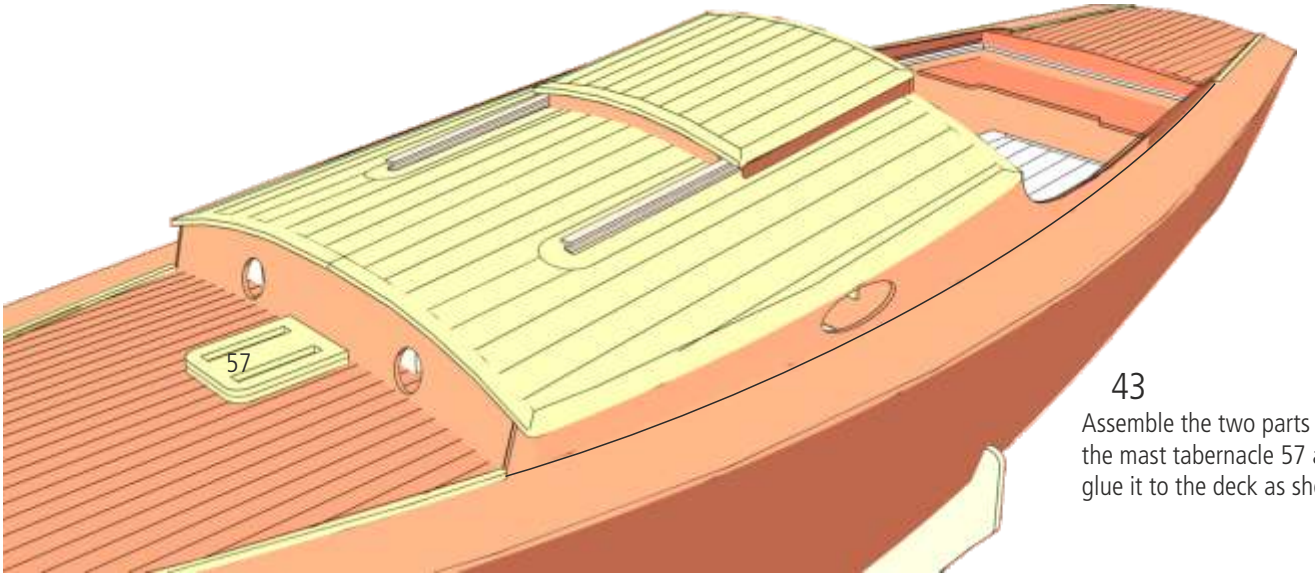




42

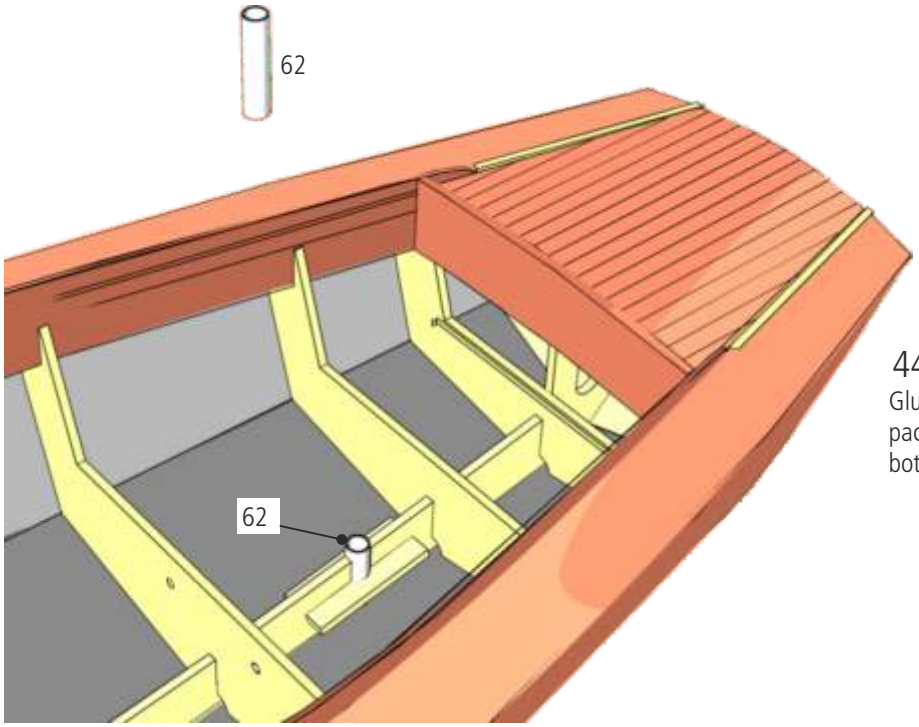
Glue the hatch rails 56 to the cabin roof in the positions indicated by the engraved lines. The rails should be bevelled slightly on the underside as shown by the arrow, so that they follow the camber of the roof. The easiest method of gluing the rails in place is to remove the roof and frame from the cabin, as this makes it easier to secure the rails while the glue is hardening.

Glue the four hatch sides 52, 53 and 54 to the roof, followed by the hatch cover 55.



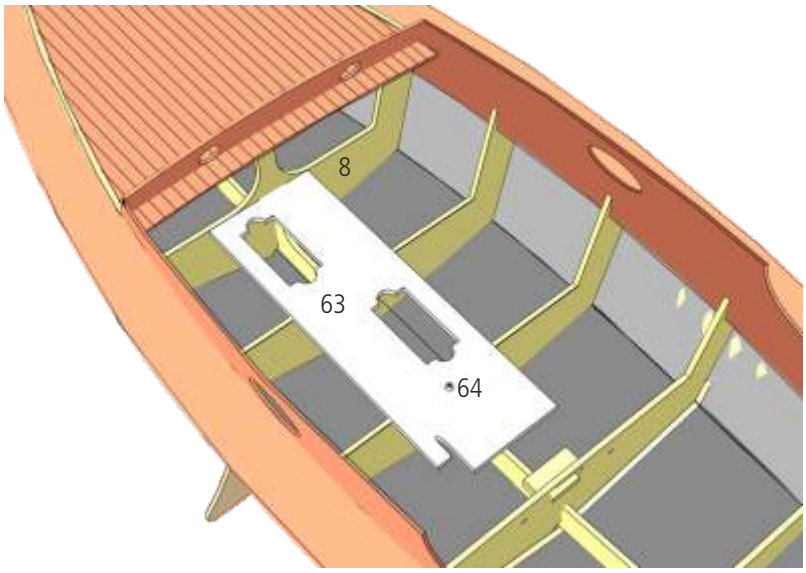
43

Assemble the two parts of the mast tabernacle 57 and glue it to the deck as shown.



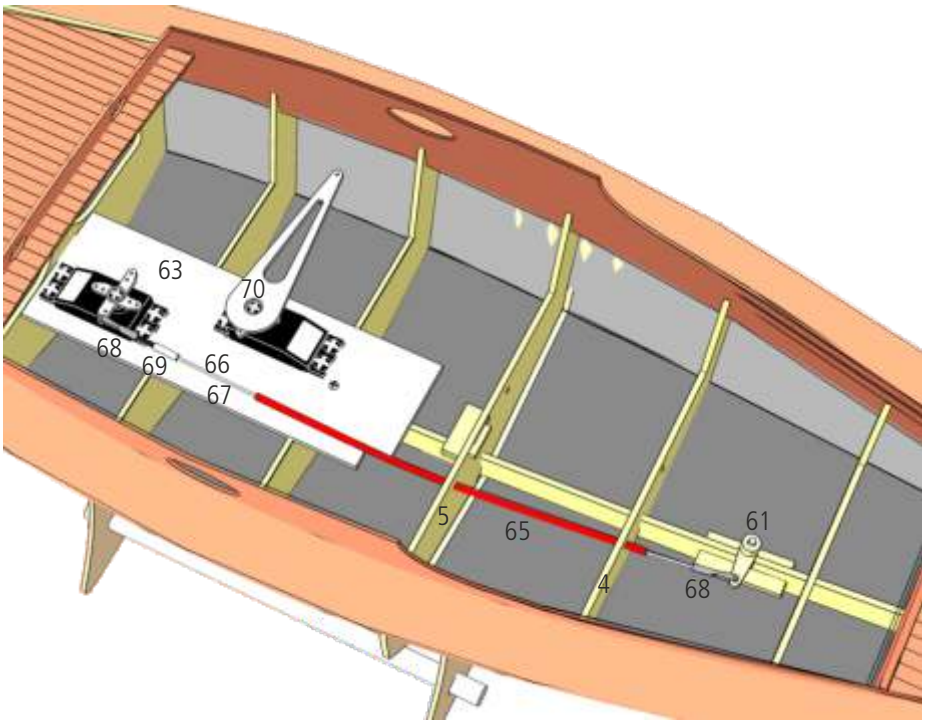
44

Glue the rudder bush 62 in the hull using two-pack adhesive; it should project out of the bottom of the hull by 3 mm.



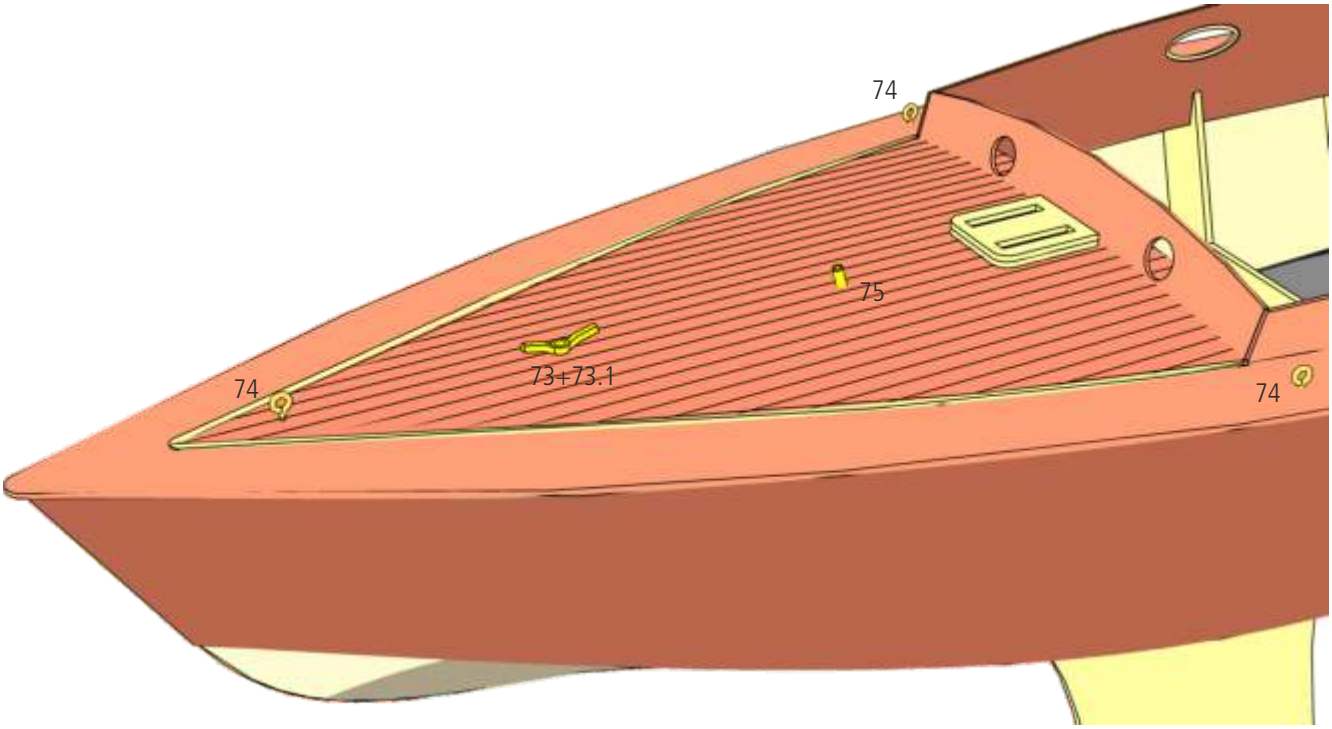
45

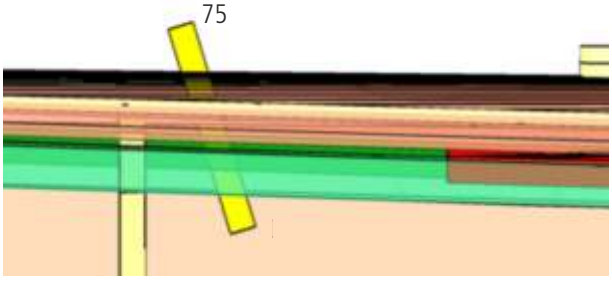
Engage the end of the servo plate 63 in the slot in frame 8, and fix it to parts 16 and 17 with the screw 64.



46

Slip the rudder 59 / 60 into the rudder bush 62 from the underside, and screw the steering lever 61 on the shaft 59.1. Thread the 'snake' outer sleeve 65 through frames 4 and 5 and glue it in place. Slip the steel pushrod 67 into the inner sleeve 66, then fit both parts in the outer sleeve 65. Screw the clevis 68 to the inner sleeve 66 at the steering lever (rudder) end, and connect the clevis to the lever. Screw the threaded coupler 69 about half-way into the clevis 68, and connect the clevis to the servo output arm. Cut the inner sleeve 66 to the correct length before gluing it in the threaded coupler 69 using two-pack adhesive.

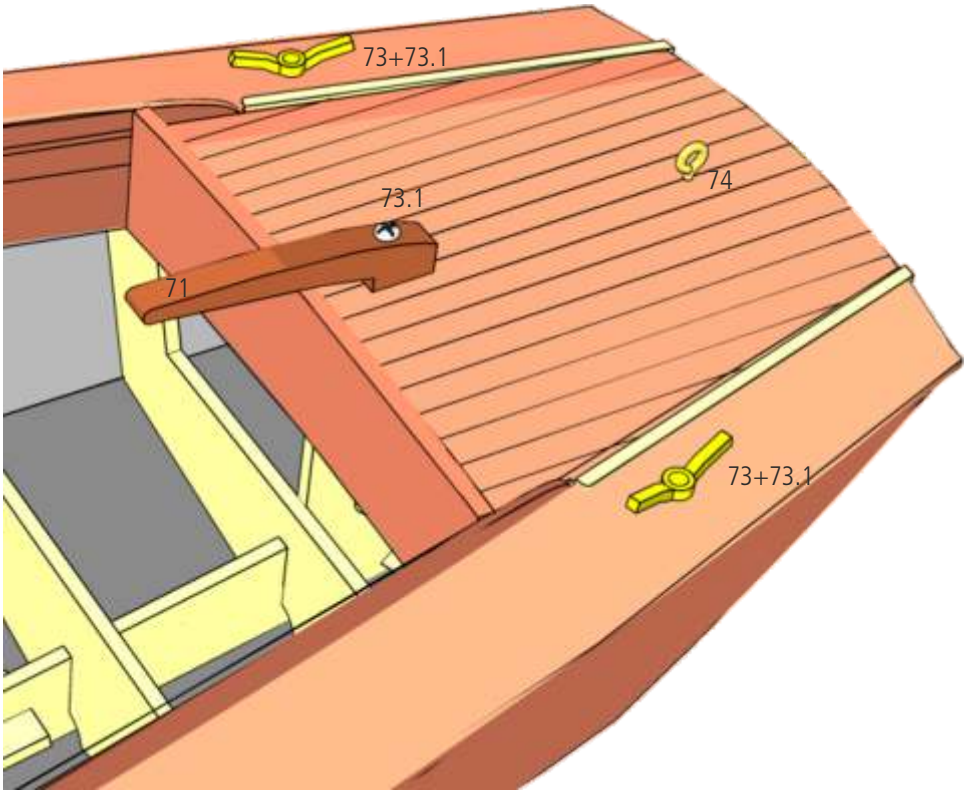


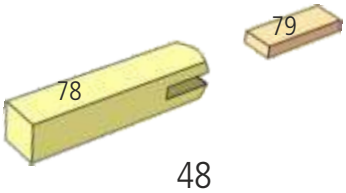


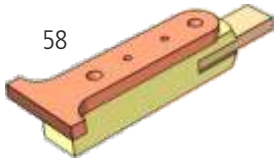
47

Drill 1.5 mm Ø holes in the deck for parts 73 and 74 at the marked points. Screw the cleats 73, the ring-screws 74 and the tiller 71 in place.

Drill an angled 3 mm Ø hole for the brass tube 75; the tube must project from the deck surface by 5 mm.

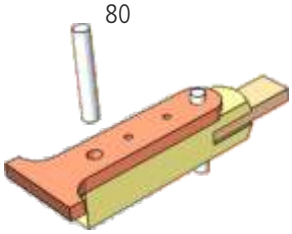






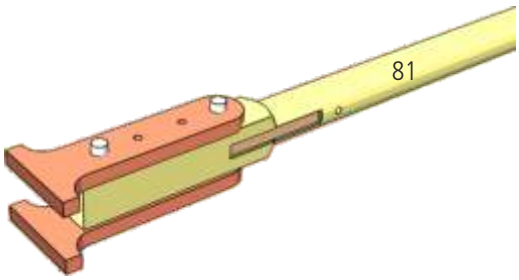
48

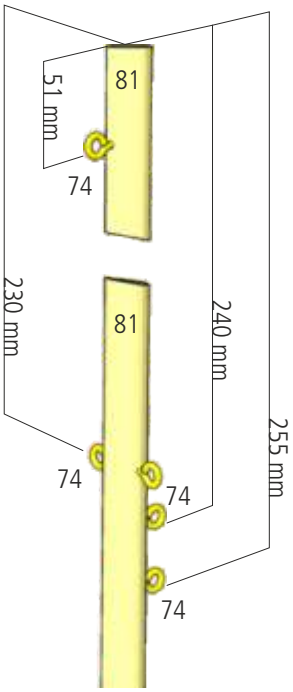
Glue the tongue 79 in the square-section mast base 78 with the edges flush. Glue the mast clamps 58 in place, leaving an 8 mm shoulder as shown.



49

Drill 4 mm Ø holes for the pins 80 right through the mast base 78, taking care to drill exactly at 90°. Push the two pins through the holes and glue the second mast clamp in place. Glue the mast 81 to the mast base, keeping the edges flush with the tongue 79.



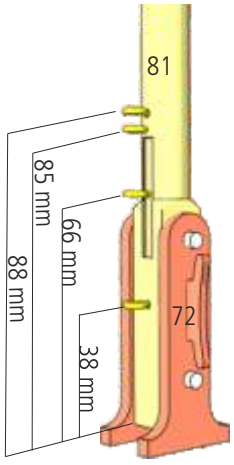


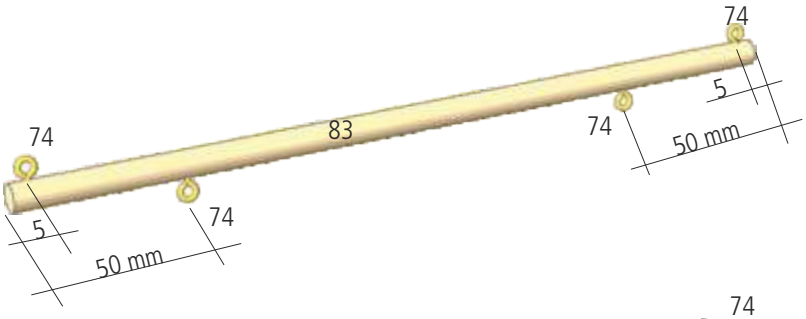
50

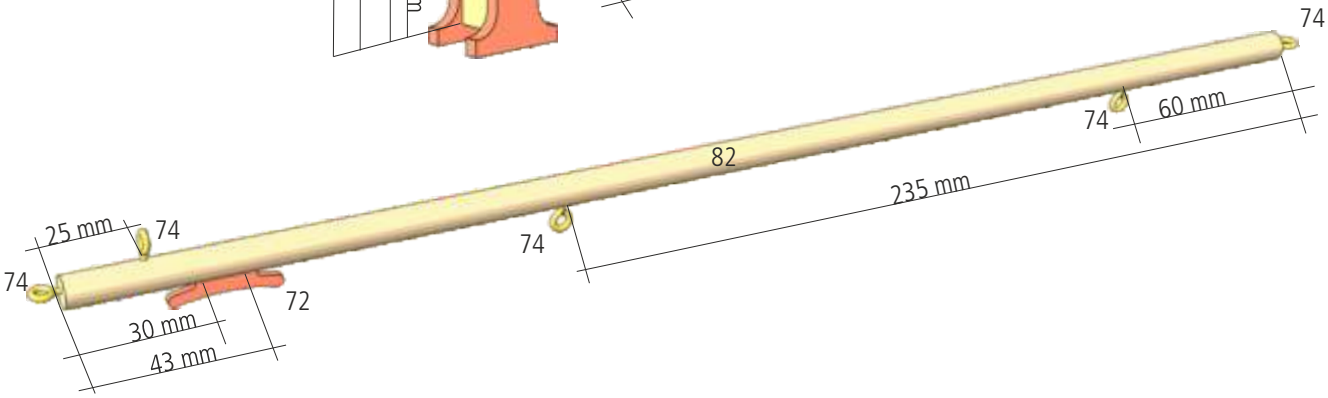
Tapering the top end of the mast to a diameter of 7 to 8 mm improves its appearance considerably.

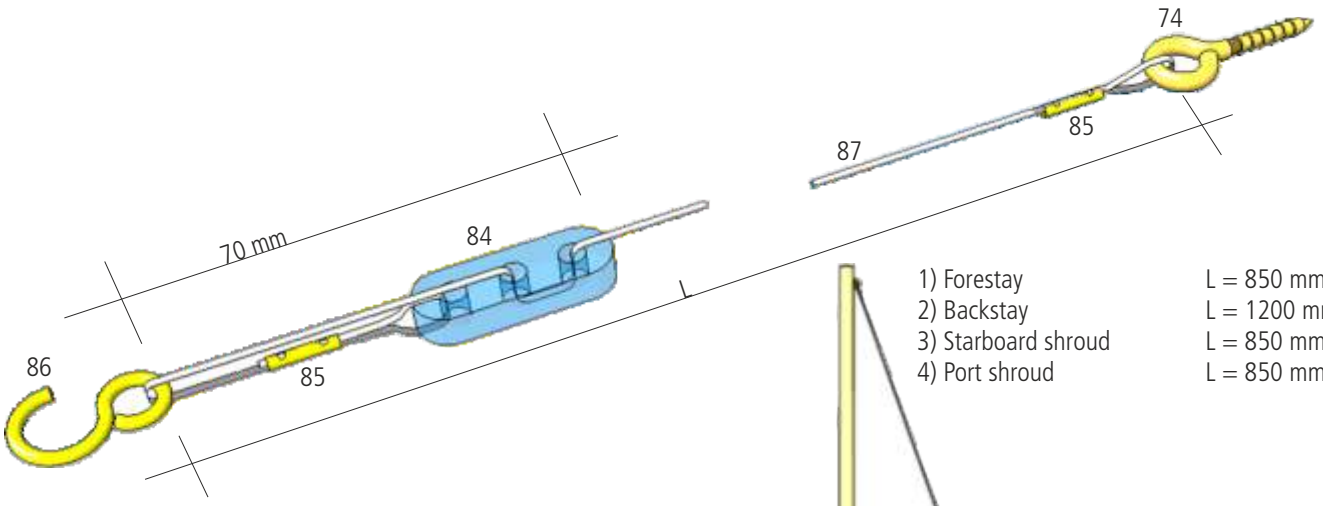
The 1.5 mm Ø holes for the ring-screws 74 can now be drilled in the mast 81, the boom 82 and the jib boom 83. Drill 1.8 mm Ø pilot-holes in the bottom part of the mast at the 88 mm point; this ring-screw is just pushed into the hole later. Some of the ring-screws have to be shortened to avoid them projecting out of the other side of the boom.

Drill 2 mm Ø pilot-holes in the boom 82 for the wooden cleat 72. Round off the pins of the cleats 72 and glue them in the boom and the mast clamp.







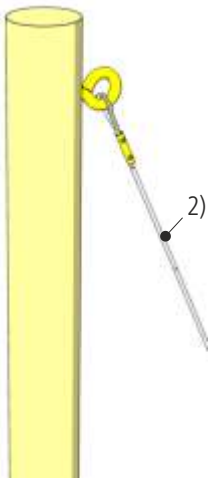


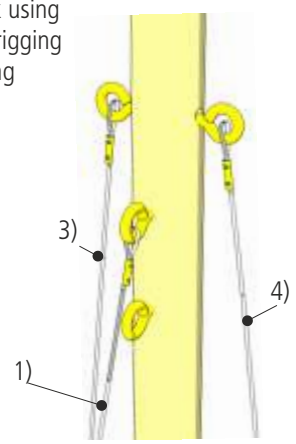
1) Forestay	L = 850 mm
2) Backstay	L = 1200 mm
3) Starboard shroud	L = 850 mm
4) Port shroud	L = 850 mm

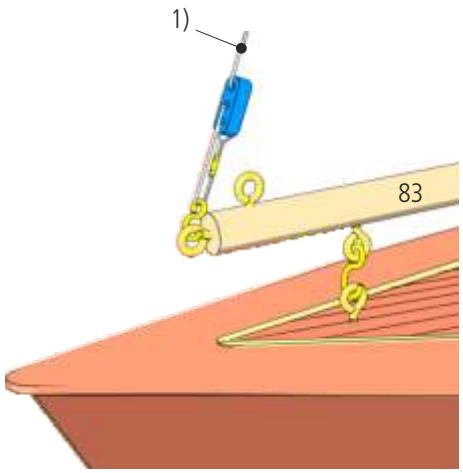
51

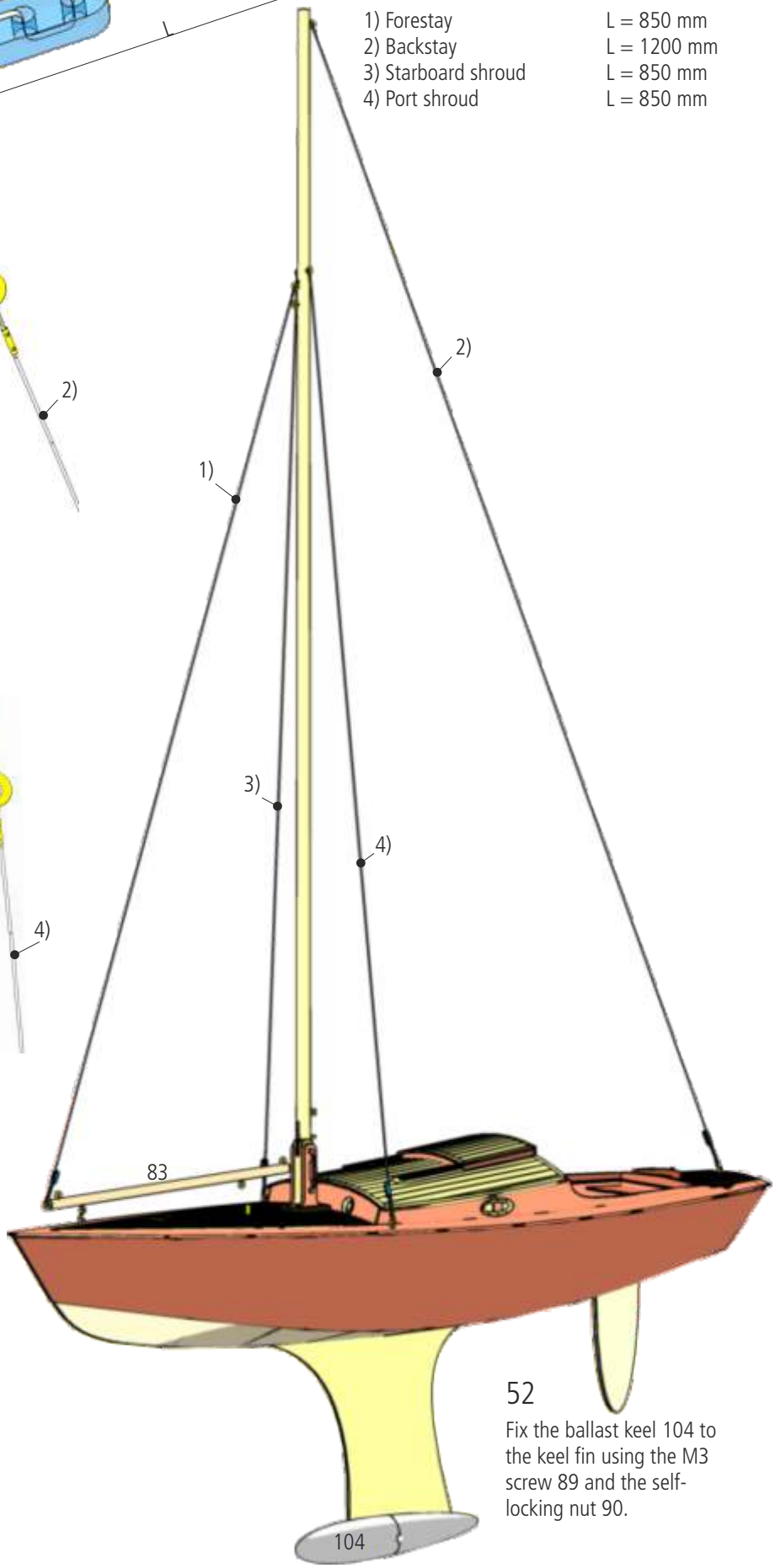
The mast is held upright on the boat by the tension in the stays and shrouds, which are made up as shown in the drawing above; the correct lengths are stated in the table. Remove the ring-screws 74 at the top of the mast before preparing these parts.

Insert the mast in the mast base on the deck. Screw the ring-screws 74 (with the stays and shrouds attached) into the mast once more, and connect the hooks 86 to the ring-screws on the deck and in the jib boom 83. Connect the jib boom to the ring-screw on the deck using a hook 86, and place all the rigging under tension using the sliding tensioners 84.



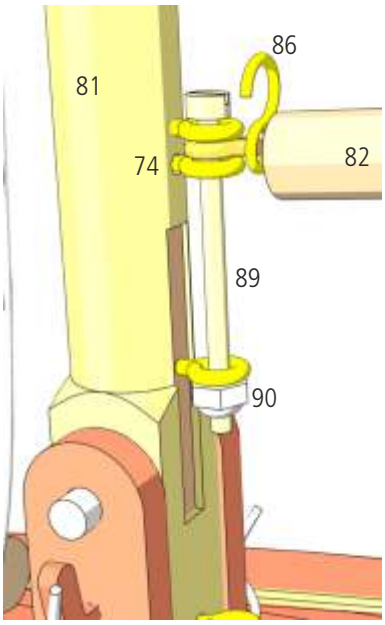






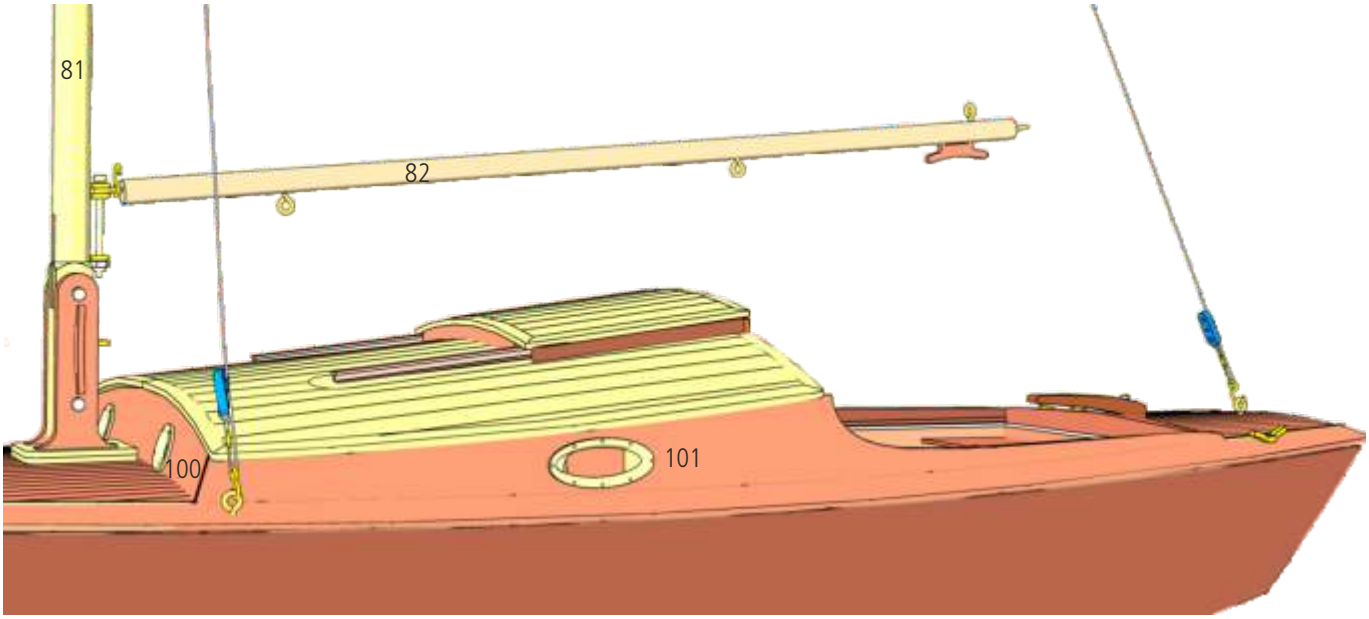
52

Fix the ballast keel 104 to the keel fin using the M3 screw 89 and the self-locking nut 90.



53

Fit the hook 86 on the ring-screw 74, and screw the ring-screw into the end of the main boom 82. Now attach the boom 82 to the mast 81 by passing the screw 89 through the ring-screws 74. Fit the self-locking nut 90 at the bottom to secure the screw 89.



54

Glue the portholes 100 and 101 in the cabin sides, followed by the glazing panels 102, which are fitted on the inside.

55

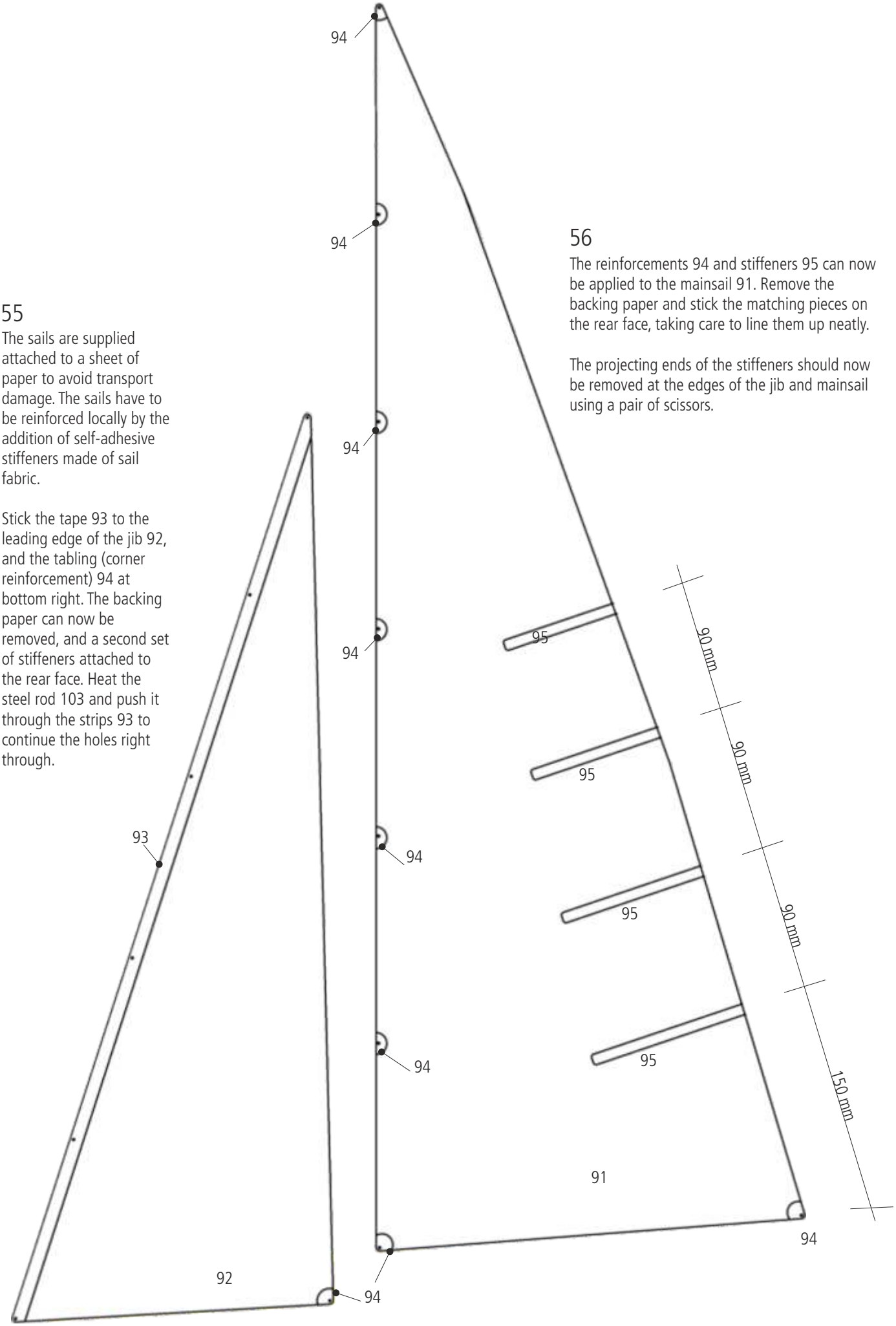
The sails are supplied attached to a sheet of paper to avoid transport damage. The sails have to be reinforced locally by the addition of self-adhesive stiffeners made of sail fabric.

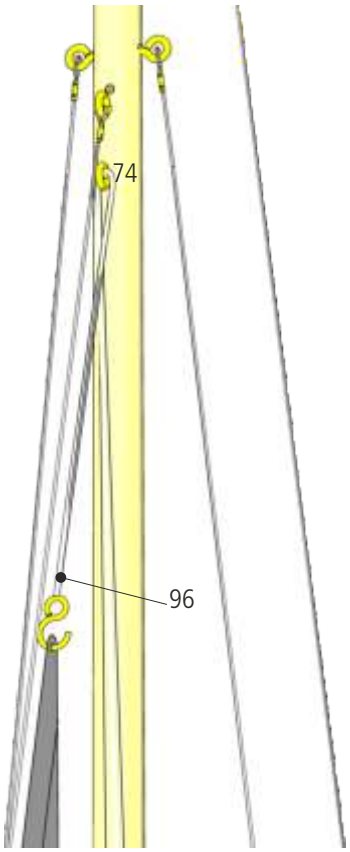
Stick the tape 93 to the leading edge of the jib 92, and the tabling (corner reinforcement) 94 at bottom right. The backing paper can now be removed, and a second set of stiffeners attached to the rear face. Heat the steel rod 103 and push it through the strips 93 to continue the holes right through.

56

The reinforcements 94 and stiffeners 95 can now be applied to the mainsail 91. Remove the backing paper and stick the matching pieces on the rear face, taking care to line them up neatly.

The projecting ends of the stiffeners should now be removed at the edges of the jib and mainsail using a pair of scissors.





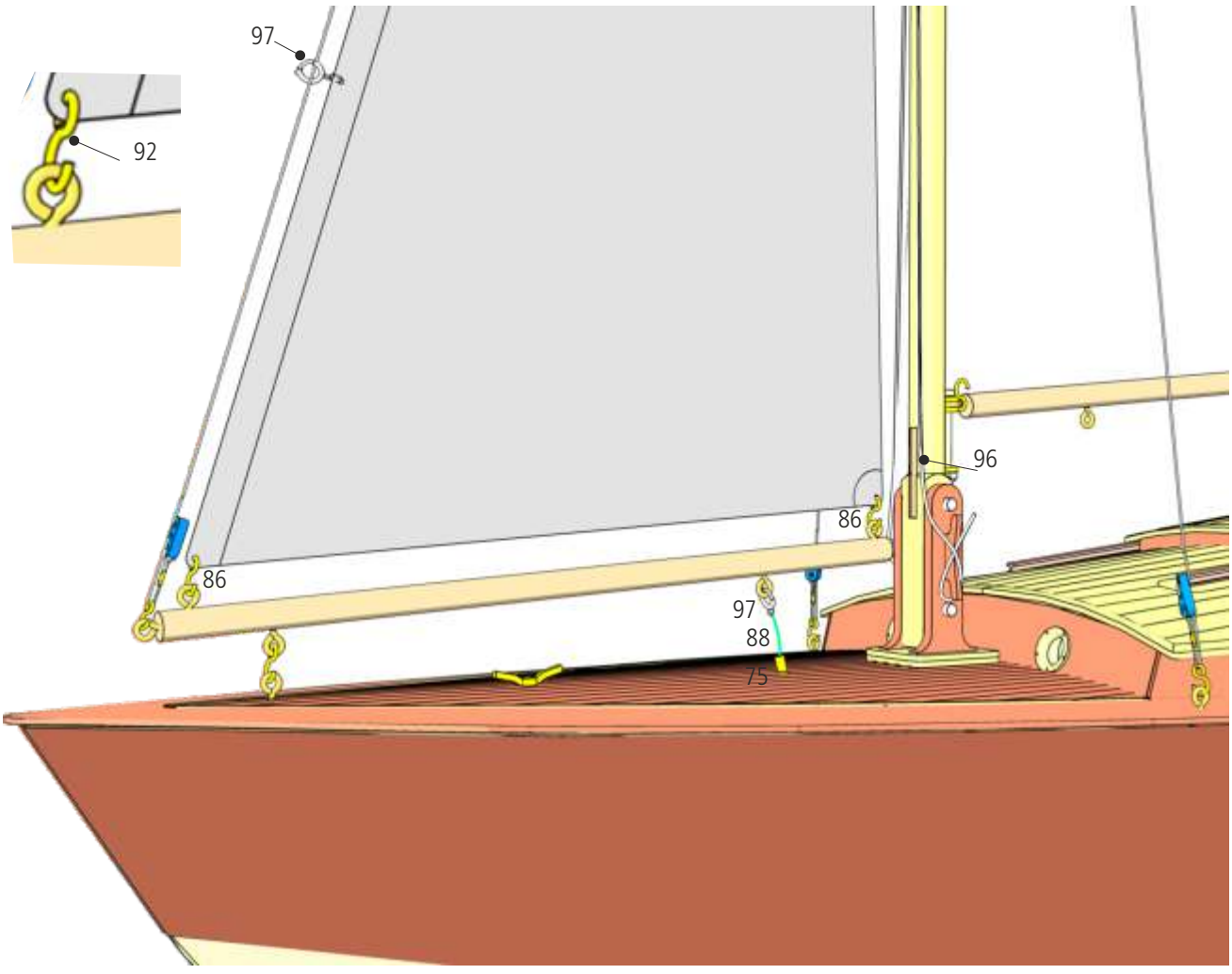
57

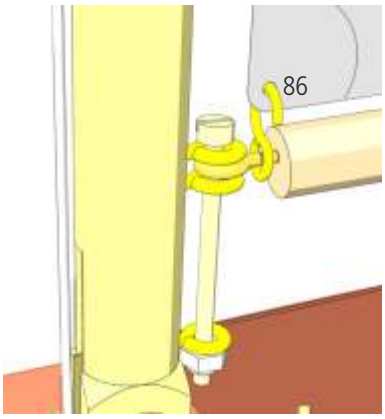
Attach the hooks 86 to both bottom corners of the jib: temporarily open up the small closed loops using a pair of pliers, fit them through the holes in the sail, then close them again with the pliers. The open part of the hook can now be connected to the ring-screw in the jib boom.

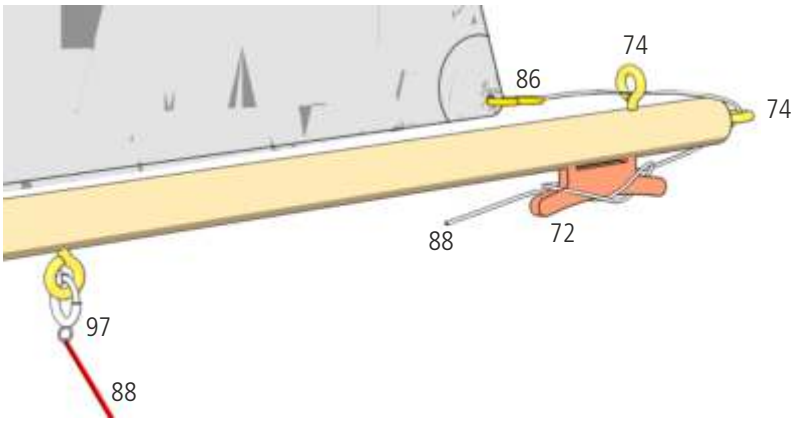
With the jib attached to the jib boom, tie a hook to the jib halyard 96 and connect the halyard to the top of the jib. The halyard is then looped through the ring-screw 74 at the top of the mast, and belayed (secured) to the cleat at the bottom.

Tie the snap-rings 97 to the jib using thread, and engage them on the forestay.

The jib is controlled using the jib sheet 88 (green), which is fixed to a snap-ring 97 and routed into the inside of the hull through the tube 75. The length of the sheet should be 65 cm.

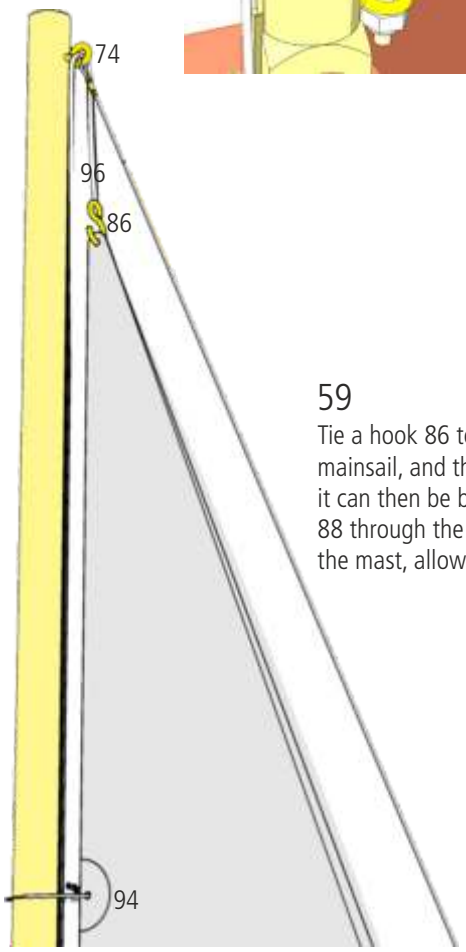






58 Connect the mainsail to the hook 86 at the boom swivel joint.

At the trailing edge the sail is secured by the hook 86 tied to the sheet 88, which is routed through the two ring-screws 74 to the cleat 72, where it is belayed (secured).

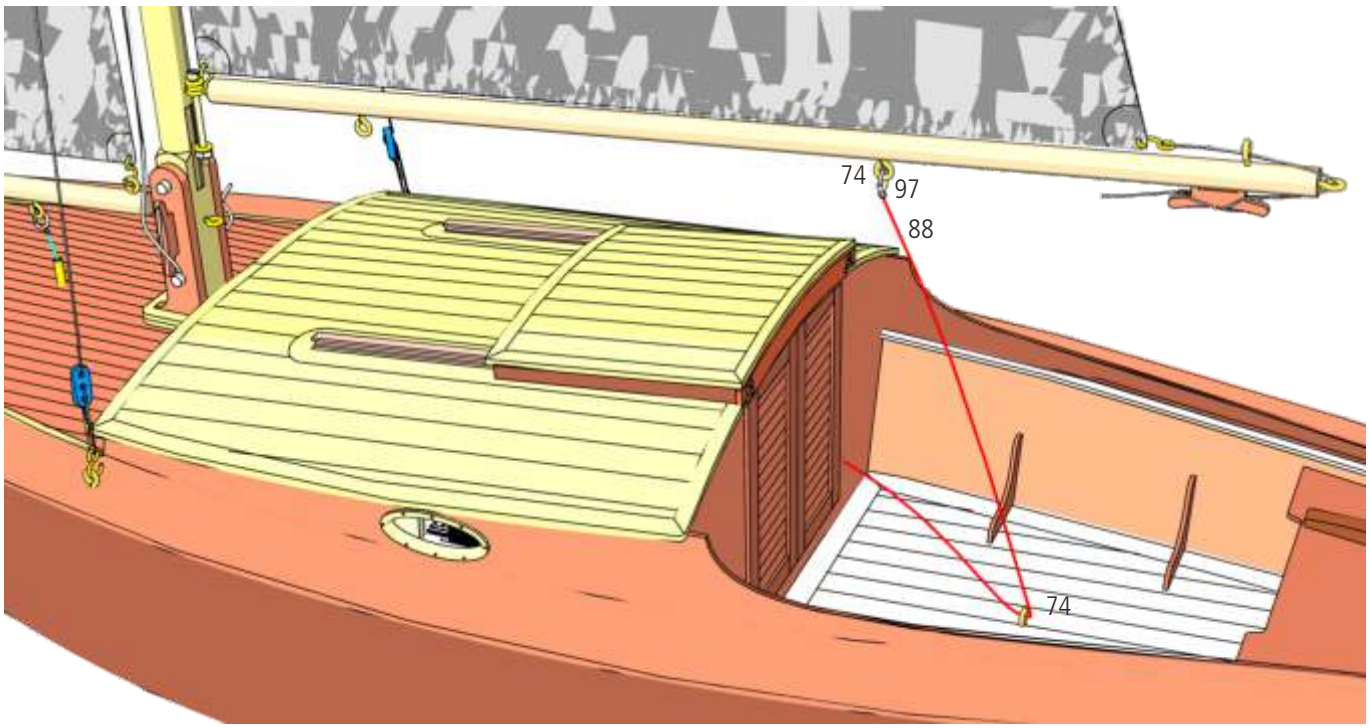


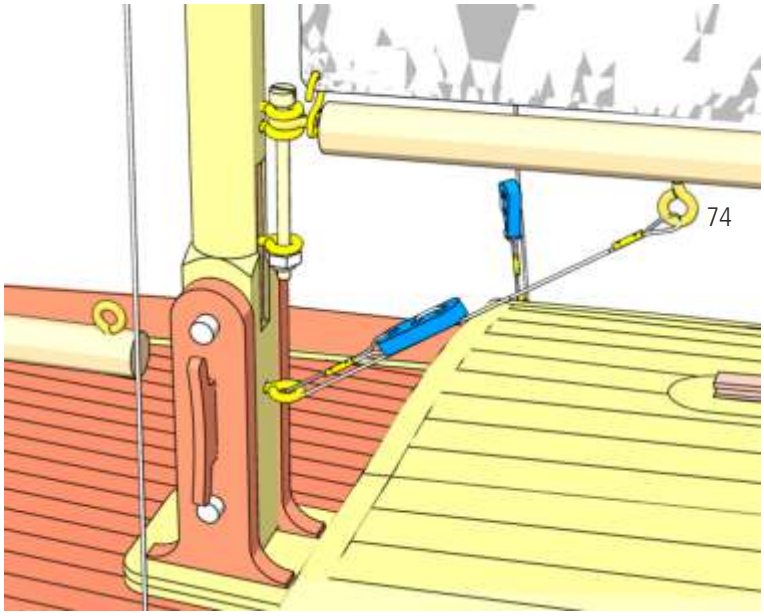
59

Tie a hook 86 to the mainsail halyard 96, attach the hook to the mainsail, and thread the halyard through the uppermost ring-screw 74; it can then be belayed to the cleat at the mast base. Fit loops of thread 88 through the holes in the sail reinforcements 94 and tie them round the mast, allowing the sails a little slack.

60

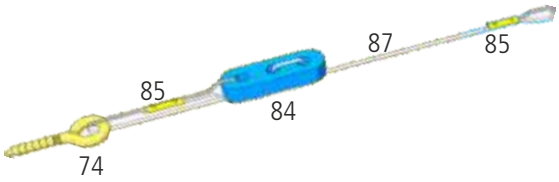
The mainsail is controlled using the main sheet 88 (red, 65 cm), which is fixed to a snap-ring 97, and connected to the ring-screw 74 in the boom. Route the main sheet through the ring-screw 74 in the bottom of the cockpit, then through the cabin wall into the interior of the boat.

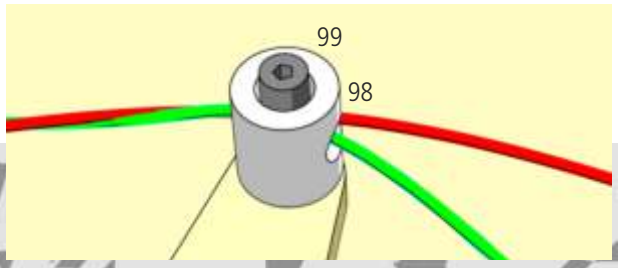


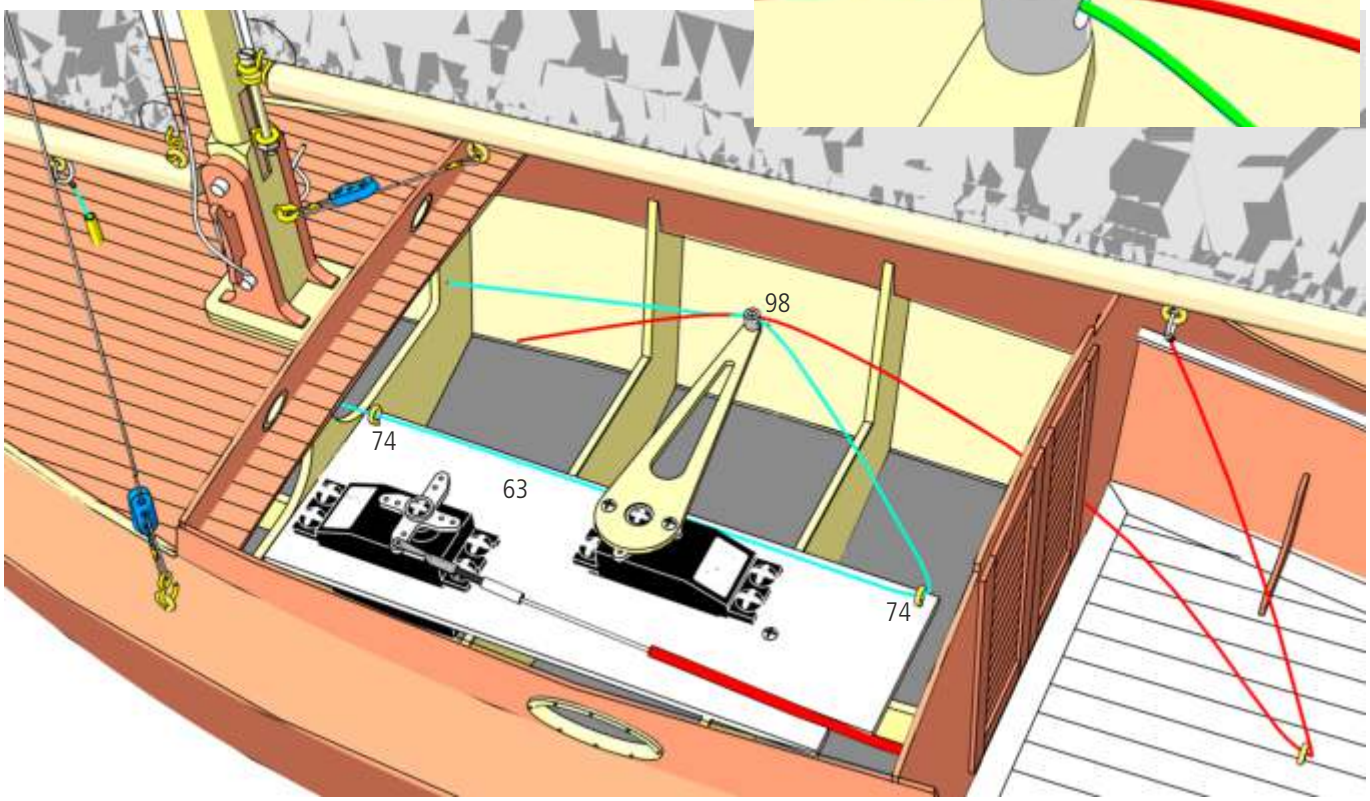


61

The main boom kicking strap is assembled from parts 74, 84, 85 and 87. The completed strap should be attached to the ring-screw 74 on the main boom once assembled, so that the braided steel wire 87 can be pulled taut before the crimp-sleeve 85 is tightened fully.







62

Screw two ring-screws 74 into the RC installation plate 63, and pass the jib sheet (green) through them and to the servo output lever. Fix the swivel barrel 98 for the jib sheet (green) and the main sheet (red) to the output lever using an M2 self-locking nut, tightened just to the point where the barrel swivels on the output lever. Now thread the jib sheet and the main sheet through the cross-hole in the swivel barrel, and turn the servo output lever to the 'fully forward' position, i.e. towards the mast: pull both sheets taut, so that both sails are at centre, then tighten the grubscrew 99 in the swivel barrel.

Mount the RC system receiver and battery to the inside of the hull sides using Velcro (hook-and-loop) tape.

Before sailing the boat, check one last time that everything is sealed against water penetration.

Parts List

No.	Description	Dimensions	Material	Quantity	
0	Jig	3 mm	Depron	1	Die-cut
1	Frame	3 mm	Birch plywood	1	Laser-cut
2	Frame	3 mm	Birch plywood	1	Laser-cut
3	Frame	3 mm	Birch plywood	1	Laser-cut
4	Frame	3 mm	Birch plywood	1	Laser-cut
5	Frame	3 mm	Birch plywood	1	Laser-cut
6	Frame	3 mm	Birch plywood	1	Laser-cut
7	Frame	3 mm	Birch plywood	1	Laser-cut
8	Frame	3 mm	Birch plywood	1	Laser-cut
9	Frame	3 mm	Birch plywood	1	Laser-cut
10	Frame	3 mm	Birch plywood	1	Laser-cut
11	Frame	3 mm	Birch plywood	1	Laser-cut
12	Keel	3 mm	Birch plywood	1	Laser-cut
13	Keel connecting piece	3 mm	Birch plywood	1	Laser-cut
14	Rear keel	3 mm	Birch plywood	1	Laser-cut
15	Stringer	2 x 5 x 820 mm	Spruce	2	Overlength
16	Support	3 mm	Birch plywood	2	Laser-cut
17	Support	3 mm	Birch plywood	2	Laser-cut
18	Hull side	1.2 mm	Mahogany / obechi	2	Laser-cut
18.1	Reinforcement	2 mm	Obechi	2	Laser-cut
19	Hull bottom panel	0.8 mm	Birch plywood	2	Laser-cut
20	Rear boatstand support	3 mm	Birch plywood	1	Laser-cut
21	Front boatstand support	3 mm	Birch plywood	1	Laser-cut
22	Stand connecting rod	10 Ø x 245 mm	Spruce	4	Overlength
23	Cabin side wall	1.5 mm	Mahogany plywood	2	Laser-cut
24	Deck support	3 mm	Birch plywood	1	Laser-cut
25	Stringer	4 x 4 x 780 mm	Spruce	2	Overlength
26	Lateral support	3 mm	Birch plywood	2	Laser-cut
27	Deck support	3 mm	Birch plywood	2	Laser-cut
28	Shroud support	3 mm	Birch plywood	2	Laser-cut
29	Transom	1.5 mm	Mahogany plywood	1	Laser-cut
30	Deck	1.5 mm	Mahogany plywood	1	Laser-cut
31	Forward boat deck	1.5 mm	Mahogany / maple	1	Laser-cut
32	After boat deck	1.5 mm	Mahogany / maple	1	Laser-cut
33	Forward trim rail	1.5 mm	Birch plywood	2	Laser-cut
33.1	After trim rail	1.5 mm	Birch plywood	2	Laser-cut
34	Rear cockpit wall	1.5 mm	Mahogany plywood	1	Laser-cut
35	Front cabin wall	1.5 mm	Mahogany plywood	1	Laser-cut
36	Fabric tape	15 x 1200 mm	Cotton	1	Overlength
37	Cockpit floor	3 mm	Birch plywood	1	Laser-cut
38	Cockpit side	1.5 mm	Mahogany plywood	2	Laser-cut
39	Rear cockpit panel	1.5 mm	Mahogany plywood	1	Laser-cut
40	Cabin wall	1.5 mm	Mahogany plywood	1	Laser-cut
40.1	Door blank	1 mm	Birch plywood	2	Laser-cut
40.2	Louvre panel	1.5 mm	Mahogany plywood	2	Laser-cut
41	Door frame	1.5 mm	Mahogany plywood	2	Laser-cut
42	Door frame	1.5 mm	Mahogany plywood	2	Laser-cut
43	Door frame	1.5 mm	Mahogany plywood	2	Laser-cut
44	Door frame	1.5 mm	Mahogany plywood	2	Laser-cut
45	Spacer strip	2 x 4 x 155	Spruce	1	Overlength
46	Knee	1.5 mm	Mahogany plywood	4	Laser-cut
47	Bench seat	1.5 mm	Mahogany plywood	1	Laser-cut
48	Roof frame	3 mm	Birch plywood	1	Laser-cut
49	Roof frame	3 mm	Birch plywood	2	Laser-cut

50	Roof frame	3 mm	Birch plywood	1	Laser-cut
51	Cabin roof	2 mm	Obechi	1	Laser-cut
52	Hatch side	1.5 mm	Mahogany plywood	1	Laser-cut
53	Hatch side	1.5 mm	Mahogany plywood	1	Laser-cut
54	Hatch side	1.5 mm	Mahogany plywood	2	Laser-cut
55	Roof hatch cover	2 mm	Obechi	1	Laser-cut
56	Hatch rail	4 x 4 x 150 mm	Walnut	2	Overlength
57	Mast tabernacle	3 mm	Birch plywood	2	Laser-cut
58	Mast clamp	3 mm	Birch plywood	2	Laser-cut
59	Rudder	3 mm	Birch plywood	1	Laser-cut
59.1	Rudder shaft	3 x 92 mm	Steel	1	Overlength
60	Rudder doubler	1 mm	Birch plywood	2	Laser-cut
61	Steering lever		Aluminium	1	7492/11
62	Rudder bush	4 / 3.1 Ø x 30 mm	Brass	1	7740/41
63	Servo plate	3 mm	Birch plywood	1	Laser-cut
64	Self-tapping screw	2.9 x 9.5	Metal	2	7768/02
65	'Snake' outer sleeve	3 / 2.1 Ø x 225 mm	Plastic	1	7498/01
66	'Snake' inner sleeve	2 / 1 Ø x 300 mm	Plastic	1	7499/01
67	Steel pushrod	0.8 Ø x 300 mm	Steel	1	7730/08
68	Clevis		Metal	2	7489/01
69	Threaded coupler		Metal	1	7489/09
70	Servo lever (sails)	3 mm	Birch plywood	1	Laser-cut
71	Tiller	1.5 mm	Mahogany plywood	3	Laser-cut
72	Cleat	1.5 mm	Mahogany plywood	3	Laser-cut
73	Cleat		Metal	3	5400/00
73.1	Screw	M2 x 12	Messing	4	7772/22
74	Ring-screw		Metal	25	5463/15
75	Brass tube	3 / 2.1 Ø x 30 mm	Brass	1	7740/31
76	Cockpit edge rail	1.5 mm	Birch plywood	2	Laser-cut
77	Cockpit edge rail	1.5 mm	Birch plywood	1	Laser-cut
78	Mast base	12 x 12 x 58 mm	Spruce	1	Oversize
79	Tongue	4 x 12 x 30 mm	Spruce	1	Oversize
80	Pin	4 Ø x 21 mm	Brass	2	Overlength
81	Mast	12 Ø x 1000 mm	Spruce	1	Overlength
82	Main boom	8 Ø x 365 mm	Spruce	1	Overlength
83	Jib boom	8 Ø x 255 mm	Spruce	1	Overlength
84	Sliding tensioner	14 x 5 x 2.5	Plastic	5	Oversize
85	Clamp sleeve	1.5 / 1.1 Ø x 8 mm	Brass	10	Overlength
86	Hook		Steel	12	Ready made
87	Braided steel wire	5000 mm	Steel / plastic		Ready made
88	Sheet	2000 mm	Thread		7718/02
89	Screw	M3 x 30	Brass	2	7778/30
90	Self-locking nut	M3	Metal	2	7766/23
91	Mainsail		Sail fabric	1	Ready made
92	Jib		Sail fabric	1	Ready made
93	Jib leading edge tape		Sail fabric	2	Ready made
94	Sail reinforcement		Sail fabric	18	Ready made
95	Mainsail stiffener		Sail fabric	8	Ready made
96	Halyard	3000 mm	Thread		7718/01
97	Snap-ring		Metal	7	5326/05
98	Swivel barrel + M2 S.L. nut		Metal	1	7490/07
99	Grubscrew	M3	Metal	2	7784/31
100	Round porthole	16 mm Ø	Metal	2	Ready made
101	Oval porthole	15 x 36 mm	Metal	2	Ready made
102	Porthole glazing	1 x 60 x 100 mm	PVC	1	Oversize
103	Rod	2 Ø x 50 mm	Metal	1	Overlength
104	Ballast keel		Metal	2	Ready made
105	Sticker		Film	1	Ready made
106	Building instructions			1	Printed